THE RAILWAY GAZETTE
A Journal of Management, Engineering and Operation
INCORPORATING
Railway Engineer · TRANSPORT · The Railway News
The Railway Times · Herapath's Railway Journal · RAILWAY RECORD.
RAILWAYS ILLUSTRATED · ESTABLISHED 1835 · RAILWAY OFFICIAL GAZETTE

PUBLISHED EVERY FRIDAY
AT
33, TOTHILL STREET, WESTMINSTER, LONDON, S.W.1

Telegraphic Address: "TRAZETTE PARL., LONDON"
Telephone No.: WHITEHALL 9233 (8 lines)

Annual subscription payable in advance and postage free
British Isles and Abroad.....£2 5s. 0d.
Single Copies.....One Shilling
Registered at the General Post Office, London, as a Newspaper

VOL. 80 No. 5 FRIDAY, FEBRUARY 4, 1944

CONTENTS

	PAGE
Editorial Notes	101
American Railways and the War	103
The Tactics of Bombing Railways	105
An Earlier Accident at Ilford	105
Letters to the Editor	106
The Scrap Heap	108
Overseas Railway Affairs	109
Rail Failures	110
Cargo Coaling Plants—II	111
Electric Traction Section	114
Wheel-Drop Pit on the Sudan Railways	117
Personal	119
Transport Services and the War	121
Stock Market and Table	128

DIESEL RAILWAY TRACTION SUPPLEMENT

The February issue of THE RAILWAY GAZETTE *Supplement, illustrating and describing developments in Diesel Railway Traction, is now ready, price* 1*s.*

NOTICE TO SUBSCRIBERS

Consequent on the paper rationing, new subscribers cannot be accepted until further notice. Any applications will be put on a waiting list and will be dealt with in rotation in replacement of subscribers who do not renew their subscriptions

GOODS FOR EXPORT

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as indicating that they are available for export

POSTING "THE RAILWAY GAZETTE" OVERSEAS

We would remind our readers that there are many overseas countries to which it is not permissible for private individuals to send printed journals and newspapers. THE RAILWAY GAZETTE *possesses the necessary permit and facilities for such dispatch.*

We would emphasise that copies addressed to places in Great Britain should not be re-directed to places overseas

TO CALLERS AND TELEPHONERS

Until further notice our office hours are:
Mondays to Fridays 9.30 *a.m. till* 5 *p.m.*
The office is closed on Saturdays

ANSWERS TO ENQUIRIES

By reason of staff shortage due to enlistment, we regret that it is no longer possible for us to answer enquiries involving research, or to supply dates when articles appeared in back numbers, either by telephone or by letter

ERRORS, PAPER, AND PRINTING

Owing to shortage of staff and altered printing arrangements due to the war, and less time available for proof reading, we ask our readers' indulgence for typographical and other errors they may observe from time to time, also for poorer paper and printing compared with pre-war standards

Industry and Post-War Planning

THE Government has approached a number of industries with a view to ascertaining their plans for the post-war period, and several have drawn up proposals. As might be expected, these proposals are necessarily tentative, and often tend to show a greater concentration on safety-first principles than the post-war condition of British industry may require. In large part this is because there has been no indication of the reward which will be allowed enterprise and efficiency in the post-war world. A recent memorandum of the British Chamber of Commerce pointed out that it was impossible for traders to formulate plans until they were advised of the intentions of the Government in relation to taxation. Obviously by this is not meant that budget proposals should be disclosed, but outside this there is plenty of room for broad statements of policy. For example, the whole question of tax allowances requires overhaul; the future of E.P.T. could be divulged with great benefit to prospective plans; and the incidence of income tax on industrial profits might receive closer attention. The present allowances for depreciation and obsolescence, for example, in some directions have had an unduly restrictive result, particularly in the case of plants which have been engaged on war production.

The late Mr. Robert Holland-Martin

Mr. Robert Holland-Martin, C.B., whose death is recorded on page 120, had been Chairman of the Southern Railway Company since 1935; he had been associated with that company or its constituents since 1910, when he joined the board of the former London & South Western Railway Company. Among other directorates, he was a Deputy-Chairman, and Chairman of the London board of Martins Bank Limited, with which his family for long has been associated, and which claims to be the oldest banking establishment in the City. Among the last major public functions attended by Mr. Holland-Martin was the luncheon held on December 22 to celebrate the coming-of-age of the four main-line railway companies, but as recently as January 19 he presided at a luncheon attended by the Minister of War Transport, who congratulated Southern Railway workers who had helped to build 64 utility locomotives to Government order during 1943. In spite of his age, Mr. Holland-Martin was Southern Railway Home Guard No. 1, and for a time helped to guard a signal box outside a main London station. His interests were wide, and included Territorial Army, hospital and other public work; and, in the realms of art and learning he was a Fellow of the Society of Antiquaries

A Railway Tradition

Mr. Holland-Martin's kindliness, good temper, and charm of manner, were in accord with what has become almost a tradition among the Chairmen of the four main-line railway companies, and which were a marked feature also of his predecessors of office, Lord Wakehurst, the Hon. Everard Baring, and Sir Hugh Drummond. That such large and nationally important industrial units as the grouped railway companies should have attracted as their Chairmen men of outstanding stature in industry and commerce would be expected, but allied with their business eminence in practically every case has gone a degree of courtesy and amiability which has been of great assistance in the first two decades of grouped railways. All the companies, indeed, have been fortunate in this respect. On the G.W.R. the courtliness of Lord Churchill was followed by the suavity of Lord Horne, which in turn has been succeeded by Sir Charles Hambro's pleasant manner. On the L.N.E.R. Mr. William Whitelaw was ever a popular figure, and his successor is the genial Sir Ronald Matthews. Similarly the L.M.S.R. has had as its Chairmen since grouping, Lord Lawrence, Sir Guy Granet, Lord Stamp, and the present holder of office, Lord Royden. Indeed, although there have been strongly marked differences in personality among the railway chairmen, their charm and courtesy has been a common characteristic.

Claims against Railways

In a recent article on "Claims against Railway Companies" our contemporary *Food* points out that food concerns are particularly interested in the standard conditions under which "damageable goods not properly protected by packing" are conveyed. Such goods the railway companies are not prepared to carry except at owner's risk. In instances of partial loss, consisting of damage, pilferage, deviation, mis-delivery, delay, or detention, the statutory periods within which complaints or claims have to be made are respectively three days and seven days of the termination of transit. Recognising the difficulties of traders in wartime because of the general shortage of labour and the extended length of transits of freight train traffic, the railway companies intimated in July last that complaints and claims lodged within six and ten days respectively would be treated by them as complying with the provisions of the relevant

standard terms and conditions of carriage. Further, it may be recalled that, for the same reasons, the railway companies, with the concurrence of the Ministry of War Transport, agreed in October, 1941, that where a whole consignment or a complete package or packages forming part of a consignment is lost, any complaint would be considered if it is made within 28 days and the claim lodged within 42 days of the despatch of the goods, instead of within the statutory limitations of 14 and 28 days respectively. It is also of interest that the railway companies, as a wartime measure, have entered into an arrangement with some traders under which the traders agree not to lodge claims, within certain specified limits, but to accept in lieu of individual payments a fixed percentage of their carriage accounts, which is calculated on the basis of previous experience and is subject to review from time to time. The advantages of such an arrangement to traders dealing with a large number of claims are obvious.

Overseas Railway Traffics

On the news of the Argentine Government's rupture of relations with the Axis powers there was a sharp rise in the prices of stocks of British-owned railways in Argentina. This advance was most marked in the debenture stocks and was continued. Ordinary and preference stocks also improved but later showed some immobility. Traffics are still rising and in the 29th and 30th weeks of the financial year the increases in receipts have been £88,380 on the Buenos Ayres Great Southern, £26,793 on the Central Argentine, £21,240 on the Buenos Ayres Western, £16,020 on the Buenos Ayres & Pacific, £7,284 on the Argentine North Eastern, and £5,154 on the Entre Rios. It will be seen from the accompanying table that the Buenos Ayres Western is now on the right side with its aggregate traffic takings.

	No. of week	Weekly traffics £		Inc. or dec. £	Aggregate traffic £		Inc. or dec. £
Buenos Ayres & Pacific	*30th	120,300	+	8,100	2,506,100	+	120,480
Buenos Ayres Great Southern	*30th	244,740	+	45,200	4,979,820	+	503,040
Buenos Ayres Western	*30th	64,020	+	9,060	1,565,160	+	4,740
Central Argentine ...	*30th	160,071	+	14,427	4,262,835	+	412,200
Canadian Pacific ...	3rd	1,110,200	+	259,600	3,104,800	+	523,000

* Pesos converted at 16⅔ to £.

After a series of setbacks for some weeks the traffics of the United of Havana are again showing a slight increase, and the aggregate net improvement is now £36,901.

Canadian Locomotives for India and Jamaica

A few months ago we were able to record that work had been started on the construction of 145 locomotives by Canadian firms for service on the Indian State Railways. Details of these 5 ft. 6 in. gauge engines, of which 75 were ordered from the Canadian Locomotive Company, and the remainder from the Montreal Locomotive Works, have now reached this country, and brief particulars are given elsewhere in this issue. The orders were placed in accordance with the recommendations of an Indian Supply Mission, of which the Consulting Engineers, Messrs. Julian S. Tritton and C. Fawcett, were the technical members. An unusual feature of the contracts is that they are to the inspection of another railway administration; the Canadian Pacific Railway is responsible for the specification of all materials used in accordance with the standards ruling on its system, and it is sending a member of the staff of its Motive Power Department, Mr. J. M. Watson, to India, to supervise the erection there of the locomotives. Details are given also on page 124 of six locomotives being built by the Canadian Car & Foundry Company, also to the inspection of the C.P.R., for the Jamaica Government Railway.

Locomotive Wheel Drop Pit for the Sudan

Because of the sandy country north of Khartoum, through which the Sudan Railways run, tyre turning of the locomotives used has to be undertaken fairly frequently. The sand forms a natural grinding paste on axle journals, hub-liners, and so forth and its presence on the rails causes heavy wear on wheel tyre treads and flanges. To facilitate expeditious attention to bogies and smaller parts, a wheel-drop pit of special design has been installed recently in the locomotive running shed at Atbara. As will be seen from the illustrated description elsewhere in this issue, the main point of interest is that by the use of two jacks a complete bogie may be easily removed, and in the case of locomotives for which spare bogies are available it has been made possible to change over a complete bogie in less than an hour. The drop pit has been particularly useful in the service of the 4-6-4 + 4-6-4 Beyer-Garratt locomotives used on the Sudan railways. The use of a drop pit in this case has been essential to avoid lifting or separating the units on these large articulated engines.

Mobile Railway Fire-Fighting

Fire risks on American railways have increased considerably as a result of war conditions, due to the intensive use of freight rolling stock at relatively high speeds. The worst risks are those arising from the mass movement of oil, particularly in block trains, over certain routes. On a number of American railways, therefore, standard fire-fighting cars have been designed, and these are stationed at suitable strategic points on each system, chiefly at locomotive depots which house breakdown cranes and wrecking outfits. The fire-fighting cars are mostly long flat wagons, on which an obsolete locomotive tender body is mounted at one end, to provide a water supply, and at the other end a structure is built to house the foam generators which are the principal means of fire-fighting, foam powder supplies, hose, nozzles, and all the other equipment required. Some companies' fire-fighters are completely independent, with their own petrol motors for pumping, so that the locomotive bringing the car and crew to the fire can be released directly the car has been placed in position; others rely on steam from the locomotive for this purpose, and in some cases the locomotive tender water supply is drawn on instead of a tank being carried on the fire-fighting car itself. The Fire Protection & Insurance Section of the Association of American Railroads, apart from the present emergency, looks on these fire-fighting facilities as a valuable addition to railway equipment.

Industrial Shunting

In shunting service no less than in main-line service there is great diversity in power requirements. Some shunts involve only a wagon or two, whereas others involve the movement of trains weighing up to or more than 1,000 tons. In the United States a shunter of 600 h.p. weighing 70 tons is classed as a small machine and yet there must be many yard operations in America as elsewhere which call for a power output nearer to 60 h.p. than to 600 h.p. Little prominence is given to the work of American shunters of 100-400 h.p., though there must be many of these in service, particularly in the vicinity of industrial plant with private networks of lines. In this country the place of the relatively small diesel shunter in the industrial field is assured; in the current issue of *The Railway Gazette, Diesel Railway Traction Supplement*, is an article describing a range of such shunters, all of which are mechanically and not electrically driven. The general need is for something under 300 h.p. and for this there are several quite suitable forms of gear drive. Shunting imposes heavy strains and shocks on the transmission, so that it is an almost universal rule nowadays to include a fluid coupling in the drive.

Standardising the Rules and Signals in Spain

The amalgamation of the Spanish railways to form the R.E.N.F.E., as it is called for short, has given rise to the same problem that had to be faced in France when the S.N.C.F. came into being and the altered conditions of working called for standardised operating and signalling regulations. If anything the diversity in signalling arrangements was greater in Spain and there was the added difficulty of the two principal systems, the Norte and M.Z.A., having adopted left- and right-hand running respectively. In a recent issue of *Ferrocarriles y Tranvias* Senor Julio Nogúes discusses the difficulties of the position and the necessity of proceeding by well-planned stages, especially in the matter of alteration to signal aspects, where the risk of confusion may be considerable, however easy it may be in theory to draw up a complete new rule book, changing everything at the one instant. Much of the signalling in Spain is still very simple, and there is much diversity of mechanical design, in consequence of the influence possessed by foreign manufacturers in earlier years. Both the Norte and M.Z.A. sections have excellent examples of track-circuit automatic signalling, with motor-operated semaphores and, in later work, colour-light signals, in which the mark of American practice is plainly seen. There are not as yet many power signal boxes of any size, but some incorporate the best modern principles.

Hollow Wagon Axles

In 1941 the Mechanical Division of the American Association of Railroads adopted, as an alternative standard for wagon construction, the Urshel-Pittsburgh hollow wagon axle, and a plant has been opened recently at Allenport, Pennsylvania, which is capable of turning out an average of 500 axles a day. The raw material for the axle is a seamless steel tube formed by forging in a special mill from a pierced cylindrical billet. The tubes, cut to length, are first heated at the ends, one end at a time, in a continuous heating furnace. The walls of the heated end are then increased in thickness in an upsetting press, and the ends are shaped by a 3,000 lb. drop hammer to form the

journals, after which the tube is returned to the heating furnace on gravity rollers for similar treatment of the other end. The forming of the axles is now completed, and they are next transferred to a continuous hardening furnace, from which they pass to combined straightening rolls and water quenching tank, in which the open axle-ends are plugged automatically, so that quenching takes place on the outside only. The axles then move through a third continuous furnace, from which they are again quenched. The final operation is a simultaneous cutting to length and centring of the two ends. The 5 in. × 9 in. hollow axle weighs 177 lb. less, and the 6½ in × 12 in. hollow axle 510 lb. less, than corresponding standard solid axles, so that the saving in the tare of a bogie wagon is nearly a ton.

In Situ Rail Repairs on American Railways

Under modern load and speed conditions, flat-bottom track, as is common knowledge, suffers considerably by battering, or excessive wear of the running surfaces at the rail-ends, which causes a depression in the track at each joint, often accentuated by a tendency of the rails themselves to droop at the joints. The worse these conditions become, so much the greater the stresses to which the joints are subjected, and the harmful effect on the rails and track structure, thus accelerating the deterioration. To meet the situation, certain American railways have devised methods of reconditioning the rails in various ways *in situ*. One is the common practice of building up the rail-ends by the deposition of weld metal. A second is the cropping *in situ* of the defective ends, which the Southern Railway, U.S.A., has recently perfected to such a degree that a record has been reached, in a single day, of cropping 263 33-ft. rails to 30 ft., re-drilling, drawing up the rails and inserting 30-ft. closures at every tenth rail, between trains on a single line, by a gang of 66 men with suitable appliances. A third is the Southern Pacific method of taking the droop out of depressed rail-ends by a travelling gang of 12 men, using a home-made hydraulic press which in a day straightens from 60 to 80 rails and fishplates at the joint, in the vertical plane, in a single operation.

Vibration as an Aid to Steaming

From an account recently published in *The Engineer* of footplate trips on a "Merchant Navy" engine the lesson may again be learned that the steaming of a locomotive boiler is augmented by the motion along the track. Used in a stationary application, or in an engine that is being tried out on a test-bed, the locomotive-type boiler is not at its best, as the grate does not receive the shaking that is so beneficial to the combustion process. A stationary grate tends to become clogged with ash; the fuel stays where it is put instead of stirring about and making itself accessible to air on all sides. The riding of the "Merchant Navy" engines was reported to be good but movement of the fuel on the grate was observed, and was attributed to the irreducible minimum of vibration still occurring. Fuel put on the sloping grate near the firedoor gradually worked its way to the back end of the firebox; this is usual on the road but impossible of realisation in a boiler that is not kept moving. To vibration more than to any other cause, must be attributed the commonly observed disparity in maximum performance between locomotives in service and locomotives on the test-bed; invariably they are able to develop a higher power in service.

Cold Shoulders in the Carriage

Human problems are by no means forgotten in a total war. Victims of constitutional shyness still write to the query columns of newspapers, asking how to conquer their failing. The sages who answer these and similar questions continue to reply that there is no better cure for the bashful than for the sufferer to force himself to get into conversation with strangers in the train. This was a stock pre-war specific, dating from the days when travelling strangers wrapped themselves in such impenetrable reserve that to break it down was a worthy task to set a timid knight seeking his social spurs. Today, if we are to believe what we read about the collapse of former barriers, the problem for the shy would seem to be not how to get into, but how to keep out of, conversation in the train. We are often reminded that "we're all in this together" (not an inappropriate slogan for a crowded railway carriage), and ardent souls have even declared in print that the compartment coach is doomed, because post-war travellers will insist on the open type so as to enjoy seeing as many of their fellow passengers at a time as possible. Thus they write, in the comfortable seclusion of their offices. First hand observation in trains, however, makes us think that perhaps we have not changed so much after all, and that the travelling Briton behind his newspaper is still as formidable a proposition for the intending invader of his privacy as is his own island behind its barrier of seas.

American Railways and the War

THE American Senate has a standing committee for examining questions connected with Interstate Commerce and keeping a watch on transport developments. Last year this committee nominated a special sub-committee, consisting of three senators, to investigate the work of the railways under war conditions. Statements explaining, with a wealth of statistical detail, what has been done and is being done to meet war needs were submitted to the inquiring senators by representatives of the Association of American Railroads and were published at the end of November in a brochure bearing the title "American Railroads and the War."* The statements give complete information under all relevant heads for the years from 1916 to 1943 inclusive. There is necessarily an element of estimate in last year's figures, but actual results are not likely to differ materially from the tentative figures compiled by the statisticians. We have therefore summarised this account of the work of the railways which supplements the information contained in the article on "The U.S.A. Railways in Wartime," published in our October 22 issue. To simplify the story and avoid repetition of dates, all comparisons drawn in the paragraphs below are between 1943 and 1938 except in a few cases where a special explanation is given.

Freight Traffic

The originating tonnage of freight has practically doubled, reaching "a new all-time high" of 1,525 million tons. The average haul of 460 miles was nearly 100 miles longer and revenue ton-miles increased by over 150 per cent. to the colossal total of 730 billions, reckoning 1,000 millions as a billion according to American practice. This growth reflects a rise in the index of industrial production of over 100 per cent., but is also due in large measure to the conveyance by rail of traffic previously passing by water or road. The most striking instance of diversion is the movement of petroleum to the east by rail instead of by tank steamers sailing from Gulf ports. In July last the railways carried on an average more than a million barrels a day—equivalent to 42 million gallons: the quantity has been reduced now by one fifth because of the completion of new pipe-lines and the return of some tankers to their normal sea routes.

Freight Wagon Supply

During the years of poor trade which came after the boom of 1929, thousands of obsolete freight wagons were withdrawn from service and were not replaced. By 1938 the number of wagons owned by the railways had fallen by 25 per cent. to rather less than 1,700,000. Only 53,000 more wagons were available to deal with last year's record carryings, but thanks to good operating one wagon in 1943 did the work that needed two wagons in 1938. First the average wagon-load was increased by 5·7 tons, or 16 per cent., to 41·5 tons when less than wagon-load shipments are left out of the calculation. Then the average wagon-miles run by a serviceable wagon each day were advanced by 59 per cent. to 51. Combining these two factors of load and distance, the average wagon performed twice as many net ton-miles of service each day. This statistic would not have reached the record level of 1,100 but for the whole-hearted co-operation of traders and Government departments.

In the period under review the ratio of wagons undergoing or awaiting repairs to the total stock was brought down from nearly 14 per cent. to less than 3 per cent. Before the war a proportion of between 5 and 6 per cent. was thought to be the lowest attainable. By cutting that old ideal almost in half, the railways have kept more than 50,000 wagons in traffic. Measures also have been taken to strengthen the Car Service Division which corresponds to our centralised Freight Rolling Stock Control, though its powers are wider. The Division not only transfers wagons from one railway to another according to proved needs, but also has authority to place embargoes, as occasion may require, to forestall or reduce congestion of traffic. There is constant contact between the Division and the 13 Shippers Advisory Boards that cover the whole of the States, forecasting wagon-requirements four times a year and laying joint plans for adjusting wagon supply to demand.

Mr. W. C. Kendall is Chairman of the Car Service Division with headquarters in Washington. He has the aid of eight managers, each in charge of a separate section of work. At centres ranging from Atlanta, Georgia, to Seattle on the Pacific coast, there are 13 district managers who in turn supervise car service agents at 40 or 50 important traffic centres. In war-time an increased volume of rail perishable forwardings entailed the reorganisation of the Refrigerator Car Section, which is responsible for distributing to best advantage 21,000 wagons

* "American Railroads and the War," Association of American Railroads Washington, D.C., U.S.A.

belonging to individual railways and 121,000 owned by groups of railways, private companies, or packers who dispatch perishable goods. The manager of the Section is located at Chicago and, being an authorised agent of the Interstate Commerce Commission, wields despotic powers over the movement of "refrigerators," irrespective of ownership. He is, however, a benevolent despot because his administration has saved a great deal of cross haulage, reduced empty-wagon mileage, and improved the loading of "refrigerators" by something like 15 per cent.

Equally impressive is the achievement of the Tank Car Section, constituted when the need arose for supplying the eastern seaboard with oil by rail. The railways had never been responsible for supplying tank wagons any more than the British lines are and owned only 9,000 of the 145,000 tank wagons in the States. The average age of the private tank wagons was about 18 years and it was doubtful whether many of them would be equal to the stress and strain of a haul of 2,000 miles from the oilfields to consuming points in the north-eastern region. Mechanical adjustments had to be made to many wagons while they were on active service. Thousands were fitted with steel wheels and shock absorbers, termed "snubbers." In conference with the petroleum industry and the railways, the manager of the Tank Car Section was able to arrange trainlot schedules and the curve showing the trend of forwardings mounted rapidly. In August, 1942, a scheme for operating "symbol" trains was adopted with the object of using as few and as direct routes as possible, while increasing the number of through train loads. The "symbol" gives an identity to each train moving over a particular route and its progress can be watched by a simple process of reporting. Each day some 80 symbol trains leave the interior loaded and about the same number of empty tank trains starts from the eastern seaboard. By these means the Tank Car Service, the railways and Government agencies have jointly exercised such a firm control over the movement of oil that in not a single instance has it been necessary to place an embargo against either senders or consignees.

The American petroleum problem resembles in some respects the task laid on our railways when the emergency almost entirely stopped foreign exports of coal and hampered coastwise shipments. The railways, in conjunction with the Mines Department, coalowners, and traders, devised plans for rail conveyance, striving to secure through train loads and the prompt turn-round of wagons. There was a peck of trouble with cripples among the private owners' wagons which were requisitioned on the outbreak of war and were not always fit for long journeys, but the stream of convoy trains was kept going steadily. These coal trains were to all intents and purposes marked with a symbol and were sedulously shepherded from stage to stage of their long transits. Here, too, the peak of the demand for this exceptional long-distance transport by rail has passed and the main-line companies have the satisfaction of knowing that their sustained efforts helped to surmount acute difficulties as to the supply of coal to industrial plants and public utility undertakings.

Freight Train Working

More freight-train miles were run last year than ever before. The total of 710 millions represents an increase of no less than 68 per cent., but it should be explained that freight-train mileage was abnormally low in 1938; it was just a little more than three times the goods-train mileage run by our four groups. The average train load broke all records at 1,115 tons, an advance of 47 per cent. on a weight equal to the contents of five British goods trains in ordinary times. On the other hand, the greater density of traffic led to a fall in freight-train speed from 16·6 to 15·4 miles an hour. Even in normal years the average speed of freight trains in this country has been always below 10 miles an hour, but it should be remembered that with us the train miles, both freight and passenger, run in a year over an average route-mile exceed 21,000. No other country can rival this statistic which is a good test of the occupation of running tracks: the corresponding American average is no more than 3,570, showing how sparse traffic is over long stretches of line in the States. The American freight train, however, makes up in size for its infrequent passage. The railways worked a million-and-a-quarter net ton-miles over an average route mile in the year before the war, a quarter-of-a-million above the figure for the London Midland & Scottish Railway, which has the heaviest freight traffic density of our four groups.

Last year the average American freight locomotive, hauling its huge train, covered 125 miles a day, a distance longer by 25 per cent. Compared with the previous war period of 1916-1918, the number of locomotives of all types in use declined by one third, but the average tractive effort of the present-day machines is 50 per cent. higher. The railways have roughly the same aggregate tractive power at their disposal today and have manipulated it so skilfully that they moved last year's record traffic with an addition of only 800 new locomotives to their stock—about half the number included in their annual programme. At the end of last year the stock was 42,600 steam locomotives, with an average tractive effort of 52,500 lb. As in Great Britain, many locomotives are being patched up and kept in service which in ordinary course would have been scrapped and replaced. This policy, if pursued too far, may soon lead to reduced railroad capacity.

Passenger Traffic

The American railways are primarily freight carriers and in the years between the two wars there was a landslide in passenger business. In 1938 passenger revenue was 65 per cent. lower than it was in 1921. In growing numbers the populace were travelling by motorcar, motorcoach, and airplane. The war has brought about a startling change. Last year passenger-miles were four times as numerous as in 1938. The average number of passengers in a train, 215, was also nearly four times as large and the average journey, 106 miles, was 120 per cent. longer. The railways had 1,725 fewer coaches to handle this spate of travel and no new coaches have been built during the war. Some overcrowding and discomfort were inevitable, but heavy troop movements have been carried out efficiently and the public has not been badly served on the whole. In coping with the transient accretion of business, passenger locomotives have been strained hard: by covering 222 miles a day on an average, they did 24 per cent. more work last year. The trend of passenger movement in America has not been unlike the wartime development in this country, but before the war ordinary travel had not slumped here to the alarming extent recorded in the States.

Railway Earnings and Expenditures

So far we have given the pith of the exhaustive statement on the traffic situation made by Mr. M. J. Gormley, Executive Assistant, Association of American Railroads, and supported by several of his colleagues concerned in wagon distribution. Mr. C. H. Burford, Vice-President, Operations & Maintenance Department, A.A.R., dealt with the questions of materials and manpower. He stressed the urgent need for more liberal allowances of new rail and emphasised the dangers attending the shortage of 100,000 railway employees. Many of his remarks would have aptly described the position of the British railways as to the supply of stores and equipment.

Dr. J. H. Parmelee, Director, Bureau of Railway Economics, rounded off the evidence submitted on behalf of the A.A.R. with a noteworthy analysis of revenue and expenditure. The gross income of the railways for 1943 surpassed all records, exceeding by a billion and a half dollars the gross income for 1942, but higher operating costs and an unprecedented rise in taxes will probably, on the final balancing of accounts, leave the railways with a lower net income than either the 902 million dollars earned in 1942, or the 897 million dollars earned in the old "banner" year of 1929. The great increase in war traffic consequently is not bringing excessive profits to the carriers, which have a lot of leeway to make up as they had a deficit of 123 million dollars in 1938. Dr. Parmelee proceeded to discuss the disposal of railway earnings under three heads: (*a*) maintenance of railway properties; (*b*) capital improvements; and (*c*) payments in reduction of funded debt.

(*a*) Maintenance expenses have increased rapidly and are now more than twice as large as in 1938. Current maintenance has been carried out on a fairly adequate scale, but a certain amount of programmed maintenance work has been postponed to future years. On permanent way and structures alone the cost of the work deferred last year was 180 million dollars. The railways claim with good reason that they should be permitted to set up maintenance reserves out of current revenue for the purpose of overtaking arrears in future years. At present such reserves are subject to war income tax rates so that between 5 and 6 dollars might have to be set aside to leave one dollar free to replace current wear and tear after the war. If this anomaly were rectified, the railways could take effective measures to prevent their properties from deteriorating.

(*b*) During the 8 prosperous years from 1923 to 1930 the railways spent on an average 843 million dollars yearly on improvements and additions to fixed facilities, rolling stock, and general equipment. But for the spending of these huge sums, which were charged to capital account, the railways could hardly have coped with the flood of wartime business. During the three years 1940 to 1942 further capital improvements have been installed to the value of more than one-and-a-half billion dollars. The largest single item was the provision of additional freight wagons at a cost of over 636 million dollars, and 518 million dollars were spent on civil engineering works. The whole of this expenditure has been financed by the carriers themselves, mainly from their own funds.

(*c*) Every class of obligations included in long and short-term railway debt was reduced during 1941 and 1942, except equipment trust obligations which are separately financed on the security of the equipment covered. The net reduction in debt during these two years was 470 millions and further changes in the financial arrangements of 19 important companies are

under way with the object of cutting down indebtedness by another one-and-a half billion dollars.

Railways Share in the War Effort

The Statistics Bureau of the A.A.R. estimates that the total inter-city freight transport in 1943—in other words the total point-to-point movement of freight in America—was more than 1,000 billion ton-miles. This was by far the greatest movement in history and the railways did 71 per cent. of the work. The balance was borne by other forms of transport in the proportions set out below:—

Great Lakes Shipping	over 12 per cent.
Pipelines	,, 8 ,, ,,
Road Motor Vehicles	under 5 ,, ,,
Inland Waterways...	,, 3 ,, ,,
Airplanes and other carriers	¼ of 1 per cent.

The share taken by road haulage is surprisingly small as private vehicles hauling the goods of their owners are covered by the estimate as well as vehicles belonging to public hauliers. Traffic over inland rivers and canals was actually less in 1942 than in 1941, while railway traffic was nearly 200 million tons heavier. This result must be a set-back to the theorists who have induced the American Government to spend substantial sums during recent years on improving inland navigations and should give pause to the advocates of lavish expenditure on English canals.

The Outlook

Mr. H. F. McCarthy, Director of the Division of Traffic Movement of the Office of Defense Transportation, has stated publicly that the resourcefulness of the carriers has been so remarkable that there has been a tendency to gamble on their ability to meet every demand on their services. He went on to say that the traffic movement job would tend to increase with military success. That was the outlook for the next few months when there would be a shrinking of the labour available for transport concerns. Good war news would mean heavier traffic and the Director of Movement urged all branches of industry to continue to co-operate with the carriers in conserving transport. The remarkable wartime performance of the railways, which we have been privileged to describe, certainly shows the value of the liaison with the Shippers' Advisory Boards which has been gradually developed over a period of 20 years. A great story has been unfolded and this is not the end. Our own regret is that, owing to the dearth of statistics for our groups, we were unable to make more comparisons of the results achieved on the opposite sides of the Atlantic.

The Tactics of Bombing Railways

IT is impossible to say how far the true import of bombing railways and other forms of transport was appreciated by the responsible leaders of either Allied or enemy nations at the outbreak of war, and what is the extent of the lessons which have been learned subsequently. No doubt, many eminent persons will try with varying measures of success to be wise after the event when the story of the war comes to be written, and, meanwhile, we do not pretend that the knowledge now possessed by railwaymen in this country was anticipated by the forecasts of 5 years ago. At that time, the possibilities of air attack in paralysing the lines of communication of a country were alternately disparaged and exaggerated, but, fortunately, the engineers responsible for planning repair and maintenance acted upon the sound engineering principle of assuming the worst, with results that have been amply justified. Experience has shown that repeated air attacks impose a constant strain on a railway system, but that the damage inflicted can be repaired rapidly, and the resultant delay is not lengthy. When long distance from base, or comparative weakness of available bomber strength, limits the possibilities of operations, attacks on railways achieve the most satisfactory results, and it was such a policy which was exemplified by our repeated bombing of Hamm, and other important German marshalling yards and junctions, in the earlier days of the war. With the far greater range and bombing weight possibilities open to us during 1943, it was noteworthy that these attacks were not continued and that far more lasting results were achieved by bombing sources of supply (*e.g.* factories).

Many general indications have been given of the speed of restoration of damaged railways in this country, and such evidence as is available suggests that the German railway repair organisation continues to function with a speed and efficiency which has declined little from the high standard set in 1941-1942. There is nothing to show that essential traffic has been slowed for more than 3 or 4 days by the direct consequence of bombing, or that repairs are yet being held up for lack of materials. The Reichsbahn is known to be extremely short of trained railway labour, and it is probable that the efficiency of the repair gangs has been maintained at the expense of normal maintenance; such procedure is not unknown in various places under the control of the United Nations. Destruction of locomotives is in a somewhat different category, as these are regarded as not readily-replaceable machines, and it is noteworthy that the daylight fighter-bomber sweeps over the French and Belgian coastal regions have devoted attention rather to attacks on locomotives than to the tracks on which they work.

The disorganisation of normal train working caused by bombing, the repair of tracks and installations, the re-routing of trains, the evacuation of bombed sites, and the handling of claims for goods lost, delayed, or destroyed in transit, all add to the strain resulting from bombing, but the major effect is on the civilian population, and it is easy to over-emphasise its result on the enemy's war effort. After heavy bombing on the Rhineland, it appears that special carriages for season-ticket-holding workmen have been the only vehicles allowed to run during the early stages of reconstruction. Similarly, Düsseldorf barred its trams for a time to any but workers with season tickets, and the Cologne priority for factory hands has resulted in other would-be passengers failing to find any accommodation immediately after heavy air raids. Thus, it would seem that air attacks on railways and other forms of transport have their value in causing the most widespread disorganisation for a short period, and are used either when attacking forces are relatively weak, or as part of some major offensive operation, but that heavy bomber strength can be employed far more profitably in other directions in a long-term policy.

An Earlier Accident at Ilford

THE serious collision on the L.N.E.R. at Ilford on January 16, recalls the previous accident at that place, also during wartime, on New Year's Day, 1915, which resulted in 10 deaths and notification of personal injuries or shock from some 500 passengers. The early morning express from Clacton, which had run non-stop from Shenfield, approaching at about 50 m.p.h. on the through line, ran at a speed of probably at least 20 m.p.h. into the seventh coach of a heavily-loaded business train of 18 vehicles, which started from Gidea Park and was being crossed from the local to the through line at Ilford West signal box. This train, which was booked to run fast from Seven Kings to Liverpool Street, normally followed the Clacton train from Ilford but was sent in front of it if the latter was late. Out of the 25 days in the preceding month on which both trains ran, the Gidea Park train had been so sent on 13 occasions. The collision was violent; 5 coaches of the local train were severely damaged and one practically destroyed; 4 vehicles in the express were badly damaged. No error was made in the signalling and all the equipment, both mechanical signals and Sykes lock-and-block, was in good order. The driver of the Clacton express had failed to observe, although the weather was clear, the warning indication of the Ilford East distant signal, carried below the Ilford Carriage Sidings starting signal but not duplicated below the advanced starting, and did not see the home signal until he had almost reached it. He appears, even then, not to have grasped the situation at once but on doing so, however, he made every endeavour to stop. The home signal was 450 yd. from the point of collision. As were many stop signals in the London District of the Great Eastern Railway, it was fitted with a detonator placer working with it and confirmation of the explosion of the two fog signals was obtained from members of the public. The accident was a plain and very serious case of non-observance of signals. There were one or two others about the same time and considerable attention was drawn to the question of automatic train control in consequence.

Not long afterwards the G.E.R. began a number of experiments with some equipment designed in the first place by the then Chief Draughtsman in the Chief Mechanical Engineer's Department, the late Mr. E. S. Tiddeman, and improved and developed in association with the late Mr. F. V. Russell, the Superintendent of Operation. The track apparatus was a fixed ramp, similar to that adopted on the G.W.R., but of two different heights, to distinguish distant from stop signals, and was applied to several signals in the London district, especially on the line to Epping and the single line thence to Ongar. Various types of locomotive were equipped, including one fitted with the steam brake. For some time the rail motor train on the Palace Gates branch ran with the system in regular daily service and closer working at the Seven Sisters junction was permitted in consequence. Although the G.E.R. automatic train control was tested on the North Staffordshire Railway, and even supplied for trial overseas, and worked satisfactorily on its home line, interest in it declined as grouping approached and the equipment was eventually taken away.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Education and Transport

c/o Lloyds Bank Limited,
(Cox's & King's Branch),
6, Pall Mall, S.W.1. January 7

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—In connection with the letter from Mr. Eric H. Percival, published in your issue of December 31 last, the purpose of which, I must confess, I do not quite appreciate, the following facts may be of some interest. In the Personal columns of *The Railway Gazette* for the second half of last year (those of July 2 to December 31, inclusive) there appear 140 biographies which describe their subjects' careers from their commencement. Of these, 109 make no mention of education during secondary-school period; and, in the remaining 31, there are mentioned 21 schools which are listed as Headmasters' Conference Schools in "Whitaker's Almanack" for 1943, and 10 other secondary schools. The names of Eton and Harrow, the two specifically cited by Mr. Percival, do not appear.

Yours faithfully,
J. R. WHITBREAD

Lord Poulett Replies to Lord Brabazon

Phœnix, Hinton St. George,
Somerset. January 30

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I read with great interest Lord Brabazon's article in the *Sunday Express* of recent date.

Having had practical experience of railway working, I cannot agree with some of his suggestions, and in particular that concerning signalling. So that greater speeds may be obtained he advocates longer block sections, which would permit of greater braking distance. As only one train may be in a block section at a time, to carry out this suggestion would mean that there would have to be fewer trains or additional through lines laid down, neither of which seem to me to be possible with increasing traffic, and rising maintenance costs. May I suggest that the solution lies in shortening the block sections, and installing electric multi-aspect signalling as the Southern Railway has done in the London area? I think I am right in saying that in 1912 much of the rush-hour troubles at Liverpool Street Station were overcome by shortening all the block sections on the suburban lines from that station.

I am,
Yours faithfully,
POULETT

American Travel

London, N.W.
January 31

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—The answer to the point that really matters in Mr. Cecil J. Allen's letter of January 21 is that assuredly the British railways should aim at recovering all the passengers who were paying an average fare of 1s. 6d. Look at the experience of the Southern Railway! In the years 1937 and 1938 its passenger receipts were almost restored to the level of 1923, though the average fare paid by ordinary passengers was only 1s. 3d. The receipts of the other companies, which have more long-distance traffic, were down from 20 to 25 per cent. over the same period. The L.N.E.R. did worst of all in spite of its non-stop Flying Scotsman, Pullman and high-speed trains. Until 1932 the Southern's receipts were also declining, but then increased steadily year by year up to the war because frequent services at convenient times were provided and attracted the public. Not only did the Southern's suburban traffic increase at all hours of the day, but a new and valuable inter-suburban traffic was created.

The other companies have withdrawn passenger services from many branch lines, where the traffic could be transferred to road with profit, but cannot afford to sacrifice suburban traffic or neglect travel between intermediate stations on their main lines to develop long-distance business. If that has been the policy of the American railways, as Mr. Allen suggests, it was singularly unsuccessful up to the outbreak of war. In 1921 the passenger revenue of the railways was 1,153 million dollars; in 1929, with prosperity at the peak, the figure dropped to 874 million and in 1938 to 406 million dollars. The decline in revenue over the whole period is nearly 65 per cent. and there cannot have been a vast deal of long-distance travel in 1938 as the average fare collected was less than a dollar.

It is kind of Mr. Allen to quote the earnings of some of the American fliers, but most of the figures appear to relate to the war period when people in the States have been forced to go by rail and the average train over there carries four times the number of passengers it used to do. What is wanted, as I said in my letter of January 17, is the *net* revenue earned by one or two sample trains in the year 1938. But however the figures came out, the fact remains that there is simply not room in this small country of ours for any larger number of high-speed luxury trains.

The number of train-miles, passenger and freight, run over an average route-mile of our railways in a normal year is about 21,000. No other country has anything like that density of traffic and in America it will be comparatively easy to clear most tracks for a diesel-electric streamliner. One admired the enterprise of the L.N.E.R. in running the Silver Jubilee and revelled in Mr. Allen's book about the Coronation, but the Shenfield electrification scheme, now in cold store, is the type of project which is needed to improve the railway's finances, while giving satisfaction to a larger public. It may be recalled that the Committee on Main-Line Railway Electrification had little doubt that suburban electrification would be the most remunerative portion of a general scheme for installing electric traction.

Yours, etc.,
STATISTICIAN

Removal of Ashes from Smokeboxes

London, S.W.1,
January 27

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—In your issue of December 31, you include an interesting article on the subject of the removal of ashes from the smokeboxes and you make some pertinent comment on the device in your editorial on page 655.

The arrangement described in the article is both ingenious and desirable and, apparently, is efficient. It is not, however, quite correct to say that this is a new principle, as you state in your editorial, whereby the ashes are damped before being expelled. Many locomotives have been built by the British locomotive industry incorporating a device which produces similar results as the one you describe.

I well remember seeing some engines arrive overseas which had been built in England nearly ten years ago, which were fitted with a very simple and efficient arrangement for expelling damped ashes from the smokebox. This arrangement was achieved by the provision of a steam cock located below the centre of the boiler barrel, feeding steam and hot water to an ejector which was placed in a hopper or shute underneath the smokebox. This shute carried out to a point beneath the platform where it was closed by a flat door. When opening the steam cock the ashes from the smokebox were drawn down into the tube and expelled into tubs or some other arrangement. If necessary, a connecting flexible pipe could be attached to the outlet for feeding direct to vagons.

In all cases this device completely evacuated the smokebox. It should, however, be recorded that there are some locomotives where the saddle and cylinder castings might make the inclusion of this arrangement difficult.

Yours faithfully,
M. A. CRANE

Chester & Holyhead Railway

Essex House, Essex Street, Strand,
London, W.C.2. January 21

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—The 1¼ mile extension of the Chester & Holyhead Railway to the pier at Holyhead referred to in Mr. G. A. Sekon's letter in your issue of January 14 was due to Mr. S. M. Peto who became Chairman of the company in 1851. At the half-yearly meeting held on August 28, 1852, he said: "Fifteen months since when I became the Chairman of your company I found your line terminating a mile and a quarter from Holyhead, having no connection with the harbour, without the possibility of loading or unloading a single ton of goods and with the means only of taking our passengers on board the packets by a number of omnibuses not very well served. Your board applied themselves immediately to the obtaining from the Government the right of carrying down a railway to the end of the pier. They were met, after strong representations on their part (I must say in this instance) more liberally by the Government than they were ever met before, and your company have now a railway complete to the end of the pier at Holyhead." (*Herapath's Journal, September 4, 1852. Page 943*)

It would seem extraordinary that a line, built for the express purpose of serving the steam packet boats to Ireland for a distance of 85 miles from Chester and across the Conway Estuary under and round the sea-washed brink of Penmaenmawr, and

over the Menai Straits by one of the outstanding engineering triumphs in the Kingdom, should ever have finished up lamely 1½ miles from its objective.

Yours faithfully,
KENNETH BROWN

Smoking in Railway Carriages

150, Allestree Lane, Allestree,
Derby. January 27

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—In view of the large number of complaints received by the railways *re* passengers, especially members of the Forces, smoking in non-smoking compartments, the companies duly issued their small poster "To Smokers." It has been said that this has brought about a little improvement which I myself have noticed, but the evil has far from been overcome.

I should have thought that if notices to the effect could be placed in the compartments themselves the evil might be considerably lessened, for to the non-smoker all this smoking is most annoying. Even in open vestibule stock this can become very unpleasant, and I should suggest that even some of these could be set aside for no smoking and so labelled, as we rarely see this. There seems to be little difficulty in enforcing this rule on the lower decks of double-deck buses, so I see little reason why it should be so difficult to enforce same in trains.

Yours truly,
JOHN L. MAKIN

Post-War Passenger Rolling Stock

94, Market Street,
Manchester, 1. January 27

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—The extensive rebuilding scheme which will be necessary after the war for railway passenger carrying stock, will create a great opportunity for revolutionary changes which are long overdue. The first and most important is the abolition of first class carriages and the substitution of one class carriages on all trains. In the case of local trains, easier loading and unloading, and greater comfort would be provided by building stock on the lines of that already in use on the old L. & Y.R. system from Liverpool to Southport—stock with end doors and seats which are reversible according to the direction of the train.

In the case of long-distance trains, similar stock would do provided the leg room were improved slightly. To meet the case of family parties, etc., a compartment might be built at one end and a coupé at the other. Lavatories would be needed in each car.

For those who are willing to pay an increased fare of, say, 50-60 per cent., for greater comfort, let us have the American parlour coach with its comfortable swivel arm-chairs, numbered seats, and a conductor for each coach or pair of coaches. Here again a compartment and coupé might be added to each coach. These coaches would not be needed on any train running less than, say, 50 miles.

The present system of providing a kitchen car, first class diner and third class diner must be very extravagant in weight hauled. Surely one type of restaurant car with built-in kitchen and one type of buffet car for cheaper meals are all that is needed. Both types could be used on the same train where there was enough demand.

The idea of placing the van in front of a train and building some of the parlour cars as observation cars would be attractive on lines where the scenery is beautiful.

The present sleeping cars are all that is needed in this small country and both types should be retained, but passengers who buy a single class ticket will naturally have to pay a very considerably larger supplement for the use of the single berth (first class) sleepers.

One final point; the principle of a fixed seat with a fixed table in front of it may be satisfactory for a dining car but it makes a most uncomfortable car for normal long-distance travel. Far too many of these cars are in use at present and no man of average size can sit in one and cross his legs in comfort. It is to be hoped no more will be built and that they will be abolished in favour of the American-type car where the seat can be reversed at the will of the passenger, thus making seats for either two or four people. In the case of parlour cars, the conductor could have portable tables which he can fix for anyone who wishes to write.

Yours faithfully,
R. H. D. LOCKHART,
MAJOR, R.A.S.C.

Decauville Track

Creran, Massey Avenue,
Belfast. January 24

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—In your January 7 issue "Metropolitan" refers to Decauville track, and seems in some difficulty as to information thereon. Perhaps you could inform him that I have some 1918 military data which might interest him, all as per list below:—

1. Small scale drawing and full dimensional details, name of makers, capacities, of steam locomotives, petrol and petrol electric tractors, wagons and trucks, for the 60 cm. gauge as used by light railways in France under D.G.T. and D.L.R.
2. Curves and graphs for rail T. and E. distances.
3. Curve tables-centre ordinates.
4. Curve and grade tables.
5. Light railway workshop layout plan.
8. Stores—expendable and unexpendable.
10. Foreways. Quantity and weight of 60-cm. track material. Composition per mile. Steel and wooden ties.
11. Light railway rules and regulations. Signals.
12. Light railway rules. Old system of control.
13. Rugeroni raft track. Tests at Longmoor, 1918.
14. Canadian Light Railway Construction Company motive power and shop rules.

— Summary of instructions, rules, etc., issued by D.L.R.
— American Expeditionary Force. Manual of Light Railways.
— File of miscellaneous notes and instructions.

If the serving officer requiring the information is genuinely in need of this type of data, I would willingly loan it to him, on the strict understanding and personal undertaking that the papers will be returned either to me here or to an address in London.

If he does not wish to inform me of his business, would he please explain matters to Lt.-Colonel Thos. Cowan, R.E., of Tn. 5, Northumberland Avenue, who will be able to advise me.

Yours faithfully,
R. DUNDAS DUNCAN, CAPT. R.E.,
Inspector of Railways, Northern Ireland

Publications Received

The Blue Book, 1944: Electrical & Engineering Trades Directory. Edited by Basil H. Tripp. 62nd edition. London: Ernest Benn Limited, Bouverie House, 154, Fleet Street, E.C.4. 9½ in. × 6 in. × 1 in. 712 pp. Price 30s. net.—The effect of further paper restrictions is rather painfully evident in the new volume of this reference book, and the tag index leaves have disappeared. Otherwise, the principal features have been continued as in previous volumes, and the alphabetical section in particular is remarkably comprehensive. We have noted some anomalies in the classified section which, however, contains complete lists of members enrolled on a National Register, members of the Electrical Contractors' Association, and members of the Electrical Contractors' Association of Scotland, under the heading "Contractors, Electrical Installation," so that very good guidance is obtainable regarding installation work throughout the country. As usual the Manager and Editor contributes an interesting preface; on this occasion a parallel is drawn between present conditions in the electrical industry and those in 1918, with the implication that it is hoped this edition will be the last in the European war. A word of warning is given that the best political post-war arrangements will be stultified so far as the electrical world is concerned, if reliance is not placed in the commercial and technical ability of those within it. The possibilities for the increased use of electricity in post-war housing, industry and transport, to say nothing of radio and television, are suggested to be enormous if they are attacked with energy and resolution

The A.B.C. of L.N.E.R. Locomotives. Compiled by I. Allen and obtainable from him at 225-227, Laleham Road, Staines. 6 in. × 4 in. 64 pp. Fully illustrated. Price 2s.—With the publication of this booklet, Mr. Allen has completed the "A.B.C. Locomotive Series" for the railways of Great Britain. All L.N.E.R. locomotives are listed in numerical order and the class of each is indicated; lists are also given of named engines. A table at the end gives for each class the wheel arrangement, name of designer, building date, weight (engine only), boiler pressure, cylinder dimensions, driving wheel diameter, and rated tractive effort. A list of the principal locomotive running depots is given.

The Scrap Heap

British railways haul loaded freight wagons 11,000,000 miles a day—equal to 46 trips to the moon every 24 hours.

* * *

The villagers of Troutbeck, in the "John Peel Country," go to church in the L.M.S.R. station waiting-room because their parish church of Mungrisdale (Cumberland) is 3½ miles away. The Vicar, The Rev. Laurence Nobbs, bicycles over every Sunday to conduct the services.

* * *

The Same Language?

In Colonel N. A. Ryan's lecture to newly-arrived American Transportation Corps Officers in this country (see our issue of January 28, page 85), he said that the capital investment in British railways amounted to $5½ billion. Doubtless, most British railwaymen realise that this is an approximate conversion into American currency of capital assets totalling more than £1,000 million. Yet the coining of the word by France in the 16th century out of *bi* and *million* was designed to denote the second power of a million, and this is still the meaning of the word in our own country. Thus, by a billion we mean a million million; in the U.S.A. they mean but a thousand million .

* * *

The illustration below shows one of the tickets of admission to the fiftieth anniversary celebrations of the Stockton & Darlington Railway, held in September, 1875. "A great concourse of engineers and railway men," says *The Engineer*, assembled on this notable occasion. The Pease family still held the reins (or better, the regulator) of this pioneer railway, as will be seen from the signature on the ticket. The celebrations themselves were notable for the fine collection of locomotives assembled there, numbering about forty in all; and the event itself formed a brilliant climax to the history of the line before its absorption into the North Eastern Railway in the next year.

21 Years of Grouping

Recently four main-line railway companies came of age. They were formed 21 years ago, from 120 individual companies.

Naturally, one's heart goes out (in retrospect to 116 managing directors, 116 general managers, 116 chief engineers, and chief superintendents, and Heaven Knows What, who were, by and large, redundant. But I said: "Let us see rather what the change has meant to ordinary lowly toilers, burdened by the crushing directions of numerous bosses. Let us *par example* (French) compare an *A B C* of 1920 with one of today.

"Let us compare times and prices."

So I rang the London Editor of *A B C* and said: "May I borrow an *A B C* for any month in 1920?"

He was ever so kind and regretful, but said that the old *A B C's* were packed away in the country and would take some time to disentangle. However, he had some for 1914.

So I thanked him very much and rapidly accosted *The Railway Gazette*, the Southern Railway, the L.M.S.R., the G.W.R., and the L.N.E.R.

"We can lend you a 1920 *Bradshaw*," said *The Railway Gazette*.

But I declined courteously, because the *Bradshaw*, a great and worthy publication, always leaves me a bit aghast, if you know what I mean, and it does not carry the prices.

The railway companies were likewise N.G. I said to the girl at the L.N.E.R. that I was contemplating something desperate, and she begged me not to.

"If I do not," I said, "it is only because I feel that in you I have a *friend*." I was always a lad to appreciate a pleasant voice, in a dame.

The Patent Office library was likewise N.G. So I rang up the British Museum.

"We have the publications," I was told, "but we are short staffed. Most of the places in the reading rooms are taken by representatives of Allied Governments and high officers of the Services. Your application will be considered on its merits."

On the morrow I betook myself to the Museum. Every few yards I was challenged by uniformed officials. The remaining statues had their faces turned to the walls. When I got to the appropriate reading room, I waited one hour ten minutes for the *A B C*. Most of the time I was sunk in gentle melancholy. The rest I spent glaring at aliens, who could apparently come in, order great files and a dozen or so various books and get them in ten minutes. One very nice attendant explained that my books were "in another part," hence the delay.

I found that Brighton first and third singles, from London in 1920, were 8s. 6d. and 4s. 2½d. against 13s. and 7s. 11d. today. The best train took one hour eight minutes, against one hour flat today.

Fares to Manchester were 24s. 6d. and 15s. 5½d. against 46s. 10d. and 28s. 2d. today. The best train took 4½ hours. Today the 10.15 a.m. knocks 13 minutes off that time.

London to Newcastle cost 38s. 3d. and 22s. 7½d. in 1920, against 69s. 4d. and 41s. 7d. today.

The famous 10 a.m., which used to arrive at 3.58 p.m., is now scheduled to take two minutes longer, but the 10.5 p.m. does the trick in 5 hours 53 minutes, not so bad for 268 miles.

Short-run suburban hauls on electrified systems show a great improvement.—*Alan Tomkins, "The Man with the Inquiring Mind," in "The Sunday Dispatch."*

* * *

Tailpiece

(Electro-steam shunting locomotives are in use in Switzerland)

A problem most upsetting
For Swiss ringed round with war
Is how to keep on getting
The things they had before.

The problem is a snorter,
To solve it is the goal.
Supplies get short and shorter,
And one of them is coal.

Your Swiss is no despairer;
He'd rather act than dream.
When coal for steam got rarer
He tried electro-steam.

He thought and toiled and tested
Until the thing was clear.
What problem ever bested
The railway engineer?

E. C.

North Eastern Railway Company

Fiftieth Anniversary of the opening of
The Stockton and Darlington Railway
27th & 28th September 1875

Name J. Dobbins Esqre

This Card entitles the holder to travel free from Stations on the North Eastern Railway to and from Darlington for the above occasion, is available for Special Excursion Trains & admits to Exhibition of Locomotive Engines &c.

Henry Pease (Chairman of the Committee)

1825 1875

№ 120

Post-War Planning

"I use the rush hours occasionally as a means of keeping fit for the post-war Sales Scramble."—By Gittins
[From "The Evening News"

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

UNITED STATES

Locomotive-Shops Extension

The Northern Pacific Railway, with the approval of the War Production Board, has placed a contract, involving the sum of $1,450,000, for the extension of its locomotive shops at Livingston, Montana. The programme includes the provision of a new locomotive machine-shop, a maintenance equipment repair-shop, a two-storey storehouse and shop office with basement, a lumber shed, and an extension of the transfer table.

Union Pacific Locomotives

One of the largest single locomotive orders placed in the U.S.A. for some time has been awarded by the Union Pacific Railroad to the American Locomotive Company, and is entirely for steam locomotives. It provides for five of the powerful " Big Boy " 4-8-8-4 articulated type, twenty of the 4-6-6-4 articulated wheel arrangement, and ten 4-8-4 passenger locomotives.

The Twentieth Century Explosion

An inquiry by the Interstate Commerce Commission into the derailment of the Twentieth Century Limited of the New York Central System on September 7 has proved beyond question that overheating of the crown-sheet, as a result of low water, resulted in the boiler explosion which caused the derailment. The train was travelling at 70 m.p.h. when the mishap occurred. The boiler was torn loose from the chassis, shearing through all rivets in the smokebox connection, and came to rest 900 ft. ahead, facing in the opposite direction and nearly upright, and 35 ft. south of the track, which at that point is practically straight. Parts of the locomotive wreckage were strewn in all directions over a radius of 500 ft. ; the firebox crown-sheet, with the upper part of the door-sheet and parts of both side-sheets attached, was found, turned inside out, to the right of the track about 400 ft. forward. At the point of the explosion the track itself was depressed 2 in. The chassis and tender, all wheels of which were derailed, came to a stand 1,300 ft beyond ; and eleven of the coaches were derailed.

Examination of the wreckage showed that 19 sq. ft. of the crown-sheet had been overheated, and that the water level had fallen 3½ in. below the highest point of the crown-sheet. The locomotive had travelled 17,558 miles since the last previous shopping, and on the run in question had worked without trouble as far as Buffalo, when the fireman reported that the operating rod which controlled the throttle of the centrifugal feeding-pump had become disconnected. Thenceforward the injector was used to supplement the feed-pump until a block signal stop occurred at Rochester, where the operating rod was connected by the crew, only to become disconnected again ; a further attempt at repair was made at Waynesport coal-stage, but again disconnection occurred. The feed-pump throttle thereupon was opened wide enough more than to supply the boiler, and the water supply was controlled by starting and restarting the pump with the over-speed feed mechanism. A relief locomotive was waiting at Syracuse, but the crew who took over at that point decided to proceed with the train engine, after the situation has been explained to them. As the latter were killed by the explosion, and the wreckage of the boiler was so complete, there was no means of ascertaining how these men had worked the engine.

The boiler was fitted with a low-water alarm, but the I.C.C. commissioner recommends that the New York Central System should use some modern crown-sheet protective device, which could have been depended on to minimise the violence of the explosion.

Popularity of Roller Bearings

In two years from the entry of the U.S.A. into the war, 613 steam locomotives have gone into service on railways in that country, or are on order, with Timken roller bearings to all driving axles. Of these, 104 represent conversions from friction bearings ; the remainder are new locomotives. The lead is taken by the Union Pacific Railroad, with 80 locomotives; the Missouri Pacific Railroad accounts for 72 ; the Chesapeake & Ohio Railway for 68 ; the New York Central System for 50 ; and the Norfolk & Western Railway for 47. Of the total, 198 of the new engines, and 13 of those converted, are articulated locomotives. Many of the engines concerned have roller bearings throughout. In addition, 16 4-6-6-4 electric locomotives for the Pennsylvania Railroad and 10 0-6-6-0 diesel engines for the New York, New Haven & Hartford Railroad have been equipped with roller bearings to their driving axles.

ARGENTINA

New Railway Regulations

A Decree issued through the Ministries of Public Works and War on September 24 makes important modifications in railway regulations. One of these refers to the operation of the winter and summer timetables, which, in accordance with the new rules, shall come into force on May 1 and December 1, respectively, or as one single timetable, should the latter be deemed to be more convenient. The National Railway Board is authorised to advance or retard these dates according to the requirements of the public service. The timetables must be submitted to the National Railway Board for approval at least 60 days before they are due to come into force.

The Decree also provides that, periodically, the railway companies shall prepare a report, under the direction of the National Railway Board, containing full information as to rolling stock, motive power, permanent way, stations, warehouses, and other matters. These reports will be numbered, and may be delivered only to personnel directly concerned in the operation of the systems. When a report shall have been drawn up, all copies of the old ones will be returned to the National Railway Board to be destroyed. Railway officials are prohibited from divulging the contents of reports to unauthorised persons.

Railway Concession Cancelled

The concession granted to the Buenos Ayres & Pacific Railway, under Decree dated 1926 and 1928, to construct a branch from Villa Krause, on the main line of the Argentine Great Western Railway, to the district of Caucete has been rescinded by the Government. It is announced officially that this decision has been made at the request of the B.A.P.R., which has carried out the construction of the branch, to a total expenditure of 2,162,275 pesos, with the exception of the junction with the main line, the signalling, and a bridge over the River San Juan, but is unable to continue the work "for reasons given." The same Decree authorises the company to sell privately, within a year, the lands contiguous to the branch. The material withdrawn from the branch must not be used without the authorisation of the Government.

Transport of Fuel

In accordance with a Decree issued through the Ministry of Agriculture, preference must be given by the railways between October 15, 1943, and January 15, 1944, to the transport of petrol, kerosene, gas oil, and diesel oil required for the gathering of the next harvest.

To facilitate the transport from the interior to the consuming centres of firewood and other combustible materials, as well as to improve goods transport in general, the National Oilfields Department has agreed to grant the railway companies additional quotas of oil fuel.

The first consignment of coal, amounting to 120 tons, obtained from the Huaco coal mines in the Province of San Juan was loaded and dispatched to Buenos Aires and other consuming centres during September last. Reports from San Juan describe the coal as being of exceptionally good quality, and it is stated that every effort will be made to increase the output from these mines. Brief reference to the discovery of coal deposits in the area was made in *The Railway Gazette* of January 8, 1943.

SWITZERLAND

Improvements at Liestal

Considerable improvements have been carried out recently at the station of Liestal, which is between Basle and Olten, Swiss Federal Railways. The station is also used by the Waldenburg Railway, which, with its gauge of 75 cm. (2 ft. 5½ in.), has the distinction of being the narrowest-gauge line in Switzerland. Its importance is disproportionate to its size, however, as on Sundays and holidays the Waldenburg may bring as many as 600 passengers into Liestal. Previously the station had only one platform adjoining the southbound main line ; passengers for the Basle direction had to cross the latter on the level, and for Waldenburg it was necessary to cross both main tracks on the level.

An island platform, 300 m. long, has been constructed for northbound trains, served by a loop track from the northbound main lines, which now runs independently through the centre of the station ; the opposite side of the new platform is used by the narrow-gauge Waldenburg trains. Access to the island platform is obtained by means of a subway, which is carried to the streets on both sides of the station, and which has made it possible to close two level crossings. The subway was finished in 1937 ; in 1938 and 1939 the goods facilities were improved and developed ; and the new northbound track and platform, with the shifting outward of the Waldenburg tracks, have been completed in 1942 and 1943.

JAMAICA

Railway Accident

A serious accident occurred recently on the Jamaica Government Railway, when a train of six wagons, proceeding down a 3½ per cent. gradient, with 17½ deg. curves, at a considerable speed, became derailed. The driver was killed, but the fireman and guard escaped. The locomotive jumped the track at one of the curves, struck the side of a limestone cliff, and turned on its side ; its momentum carried it, in that position, for about 60 ft. Five of the wagons ran past the engine before being derailed, and two were smashed completely. The cause of the excessive speed of the train has not yet been proved. Some illustrations showing scenes of the accident appear on page 118.

Rail Failures

An L.N.E.R. train, travelling at slow speed on the down line between Tweedmouth and Kelso, was derailed by a broken rail, found to be divided into no fewer than 12 pieces

SOME interesting facts concerning a peculiar case of rail breakage were given by Mr. F. E. Harrison, O.B.E., Assistant Chief Engineer, L.N.E.R., in the course of his retiring presidential address to the Permanent Way Institution.* The breakage occurred on December 18, 1941, and a train travelling at slow speed on the down line between Tweedmouth and Kelso became derailed. It was proceeding from Newcastle to Edinburgh, but was sent back from Berwick to Tweedmouth, to be diverted *via* Kelso in consequence of an obstruction further north. The broken rail was found to be in 12 pieces. The point of original fracture could not be determined, but most of the subsequent ones were probably produced by the rail forming successive cantilevers after the original break took place. The rail, laid in 1890, was a 90-lb. one, with an average yard weight at the time of the accident of 83 lb., situated on the inside of a 19-ch. curve, provided with check rails and 3 in. of super-elevation. The engine of the train, a Pacific type locomotive, was not derailed, but the four coaches immediately behind all came off the line. During the weeks immediately preceding the derailment, the track had been used as a facing refuge for traffic from the south, waiting for other trains to pass, trains using it being later propelled back to the main line, up a rising gradient.

Condition of the Rails

There was definite evidence that slipping with a heavy load when propelling from rest had been taking place at least for several weeks, and perhaps even longer, before the mishap. Both the broken rail and others near it bore marks of this, so severe that "rippling" had occurred. It appeared also that there had been serious slipping within two days of the derailment, and it is well recognised now, as has been pointed out in our columns, that slipping can damage a rail to such an extent as to necessitate its replacement. The rail broken at Tweedmouth showed similar characteristics to one on the same branch, the breaking of which was traced to the same cause in 1940, and to one which broke in a crossing at Newcastle Central in 1939, after exceptionally heavy slipping. Analysis indicated carbon at 0·4 per cent., the normal proportion at the date the rail was manufactured, whilst sulphur was 0·11 per cent., considerably higher than is now specified. Phosphorus was 0·08 per cent. The top was abnormally hard, one Rockwell reading giving 90 tons per sq. in., whereas the original tensile strength of the rail was probably 40 tons per sq. in. Photomicrographs showed numerous cracks or incipient cracks. The heat generated by the slipping was estimated to reach about 700° C.

Results of Tests

Two sections from the longest portion of the rail were cut for falling weight test. In one test with the head of the rail uppermost, 1 ton was dropped initially from a height of 1 ft., and blows were continued, rising 1 ft. at a time. The piece failed at the seventh blow from 7 ft., and was so torn as to be nearly fractured through at one of the supports. Tested head down, the other piece broke at the first blow. Test pieces were also taken from six adjacent rails bearing marks of slipping. Seven were tested with the head up. When four were submitted to a 1-ton blow from 6 ft., and then from 15 ft., two broke at the first 15 ft. blow, one at the second, and one at the third. The remaining three pieces were tested by blows increasing 1 ft. per blow, and one piece failed at the fifth, another at the sixth, and the last at the eighth blow. Six other pieces tested head down broke at the first 1-ton blow from 1 ft. and had no resistance at all. Previous experience shows that a rail tested head downwards can offer no resistance under falling weight if the running surface has been seriously affected by heat promoted by welding at site, unless satisfactory post-treatment procedure can be introduced.

Mr. F. E. Harrison referred to the question of age affecting the qualities of rails and to the conclusions reached by Mr. R. J. M. Inglis and described in *The Railway Engineer* for January, 1932, to the effect that "long continuous service has in no way weakened these early rails by producing a fatigued condition." These particular tests, except one, were made with the rail head up, and Mr. Harrison observed that "When a piece of rail is undergoing the drop test, the upper flange is in compression and the lower in tension, and incipient cracks in the upper flange might have little effect on the result." In his view, it is necessary to have in mind the possibility of a top table with small transverse cracks becoming under traffic subject to tension, by whatever means the cracks were caused. Numbers of tests were therefore made from six rails from various parts of the L.N.E.R., of ages varying between 50 and 52 years, chosen from localities where no skidding was suspected. "I think we can endorse the opinion," said Mr. Harrison, "that age does not, in itself, carry any evidence of the introduction of 'fatigue.' One is inclined to go further and suggest that the use of the term 'fatigue' should be exercised with caution."

The St. Neots Derailment in 1895

A well-remembered case of a rail breaking into a large number of pieces was that of the serious derailment of the G.N.R. Night Scotsman from London, at about 12.30 a.m. on November 10, 1895. The train, travelling at about 60 m.p.h., was composed of Stirling's (new) single locomotive No. 1006, a van, a third-class coach, a sleeper, a third-class brake, a third-class coach, two composite sleepers, a third-class coach, and a van. Part of it left the rails about 40 yd. short of the down end of the platform at St. Neots. The locomotive and first five vehicles ran on, mostly re-railed, for 777 yd.; the others swerved to the left at the facing points of a siding 120 yd. ahead and dashed into some coal trucks. The two composite sleepers were telescoped and severe damage was caused, but the casualties were extraordinarily light, only 2 passengers being killed, and 17 passengers and 1 servant injured. Sir Francis Marindin found that there were two rails broken, one of them into 17 pieces and the other into 4. They were made of Bessemer steel in 1872 in Manchester, and were in the up line nearby from 1873 to 1886, after which they were out of use until placed in the down line in 1890. Their weight, originally 80 lb., had fallen to 70 lb. per yd. An empty train had passed without incident 20 min. before, and the express driver was unaware of anything unusual until the brake was applied automatically. Sir Francis thought the engine might perhaps have gone over some small obstacle fallen on the track after the empties passed, and that this shock had begun the failure of the rails, but no very definite conclusion was reached. No person was blamed. An elaborate report was made by six metallurgical experts, and incipient flaws were shown to exist in the rail heads. The rails were held to be of good quality originally. This accident led to the composition of rail steel being brought under careful review.

* At the Annual General Meeting on January 30, 1943

SWISS ELECTRIFICATION.—Electric traction was introduced on December 11 last on the 13-mile standard-gauge line of the Swiss Federal Railways between Wil and Wattwil in north-eastern Switzerland. Wil is on the Zürich-St. Gall main line, about halfway between Winterthur and St. Gall, and the electrified section is part of the line leading in a southward direction, connecting, by way of the Ricken Tunnel, with the Zürich-Buchs main line at Ziegelbrücke. The line was built in 1870 and was then owned and operated by the Toggenburg Railway Company. At Lichtensteig, about 2 miles north of Wattwil, it joins the St. Gall-Herisau-Lichtensteig-Wattwil line" owned and operated by the Bodensee-Toggenburg Railway Company. This line, including the Wattwil-Lichtensteig section, has been worked electrically for a number of years.

READING PREHEAT TEMPERATURES.—The accurate preheating of high-tensile steels, non-ferrous metals, and cast iron has been established as being essential to the production of sound welded constructions. The difficulty has been in obtaining a suitable method of reading preheat temperatures under workshop conditions. Tempilstiks have been found to be both accurate (± 1 per cent.) and easy to use; they are now readily available for the following temperatures—125, 150, 175, 200, 225, 250, 275, 300, 350, 400, 450, 500, 550, 600, 650, and 700 degrees Fahrenheit. Tempilstiks are chemical mixtures (rather like a crayon) with fixed melting points, and may be used in two ways:—

1. A mark about ½ in. long is made on the job to be welded in much the same way as a chalk mark would be made. Heat is then applied, and when the mark melts and virtually disappears, the temperature stated on the particular Tempilstik being used has been reached. This method should be used only when the preheating flame does not play directly on the locality where the mark has been made.

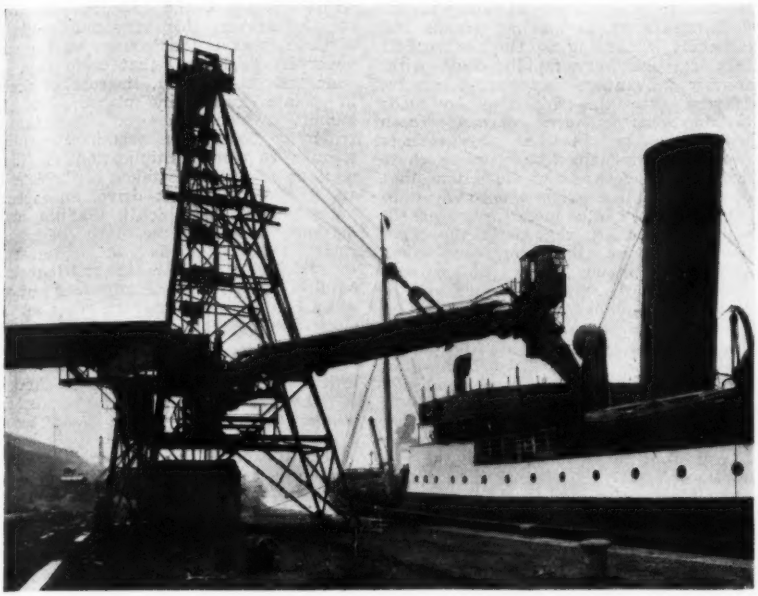
2. Where the entire surface of the work may come into contact with the preheating flame, the temperature is ascertained by periodically removing the flame and marking the job as before. The correct temperature has been reached when the mark melts as soon as it is made.

A preheating chart showing ranges of preheat temperatures recommended for different metals can be had on application to: Director for Sundry Materials, Ministry of Supply, 8-10, Old Jewry, London, E.C.2.

Cargo Coaling Plants—II*

A detailed survey of the principles and installations involved in loading coal on board ship from railway wagons

By J. Dalziel, formerly Assistant Electrical Engineer, L.M.S.R.



Conveyor plant at Glasgow

CRANES were the first appliances to be used for coal shipping. In the early days coal was loaded out of the wagons into tubs or other receptacles in which it was put aboard by cranes; this method is still in use for loading coal into, and especially bunkering, boats of small capacity with awkward hatch arrangements, for example, fishing trawlers. Later cranes were of about 25 tons capacity suitable for raising wagons of 12 tons capacity plus the weight of a lifting cradle; still more recently, in order to deal with 20-ton wagons, they have been made of 40 and sometimes 50 tons capacity. The higher capacity gives a margin over normal load desirable in this exacting duty. Such cranes have been made for steam, hydraulic, and electric operation, but in their operation they are alike; they lift the wagon together with a cradle on to which it is previously run and fastened down, afterwards swinging it inboard, lowering it through the hatches and tipping it to empty; they then reverse the process. As for hoists, the wagons must be of the end-door type and the cotter pins securing the door must be removed at the proper moment; the working staff generally devise and apply ingenious methods of doing this with wires or rods.

On older cranes, mainly steam and hydraulic driven, the cradle was tipped by chains attached to the jib; these held up the back end of the cradle (and wagon) so that continued lowering of the main lifting gear tipped it. The tipping chains could be linked up to alter the tipping point but were not adjustable in the ordinary operation of the crane. On modern cranes (mainly electric) a tipping barrel with a separate motor as well as a main lifting barrel is provided; the two work together through a clutch during normal lifting and lowering but are declutched when the tipping point is reached. Ideally the wagon should be lowered on to the coal or the bottom of the hold and then tipped for discharge by the back end being raised by the tipping motor; this minimises fall and breakage. With these cranes the point of tipping is in the full control of the operator throughout. In practice the wagon is seldom, if ever, lowered regularly down through the hatches on to the coal already loaded as this would slow up the loading rate. With cranes this is already slow enough; a loading rate of 350 tons an hour is a very good maximum.

Modern electric coaling cranes lift at high speeds and have lifting motors of up to 200 b.h.p. With a.c. power mains it is customary to use d.c. motors supplied through a motor generator on the Ward-Leonard or other similar system. Variable-voltage rectifiers would answer this purpose equally well, if not better, but the writer is not aware of any such installation. Variable speed a.c. motors would also serve the same purpose of giving closely-controlled speeds while avoiding heavy rheostatic losses and excessive mains demand. Crane coaling may be considered as turning the wagon into its own anti-breakage box, and there is no question but that there is much less breakage than with hoists not fitted with an anti-breaker. As pointed out, however, some fall of the coal must be accepted for the sake of reasonable speed of loading and generally a wagon is a very unhandy lift, necessitating in the cradle fairly elaborate provision for receiving, fixing, and tipping it as well as a considerable extra weight to be lifted and handled.

One method of coaling by crane which avoided the drawbacks of handling the wagon itself was used for many years at Cardiff; this was the Lewis-Hunter method which avoided in anticipation rather than after actual experience the drawbacks of handling the wagon itself, for it ante-dated most coal shipping cranes, certainly all the modern high-speed high-capacity ones. Its procedure was to tip the wagons into a box of capacity equal to the full load of one wagon, the box was then lifted by crane, slewed and lowered into the hold where it was discharged without appreciable drop of the coal by allowing the bottom to open. This method, though involving extra movements and appearing likely to be slow in consequence, actually achieved fairly high coaling rates an hour. The operations of handling of the wagon before and after tipping were independent of those involved in the box being put aboard the ship and discharged; thus there was no waiting for wagons to be secured to cradles and taken off again. The Lewis-Hunter method, however, was finally superseded by hoists, no doubt because these were much faster, and also less costly to run. Additional breakage was presumably accepted as the price to be paid for the advantages of turning round ships more quickly and obtaining better utilisation of the quays. So far as the writer is aware there are now no coaling cranes for cargo loading work in use in South Wales, nor are there any, of any importance at least, on the North East coast, though there are two, an old hydraulic one and a new electric one at a Yorkshire port.

Only in Scotland is there any preference for crane coaling; this is based chiefly on the supposed avoidance of breakage; an advantage which is held in some quarters to be sufficiently important to counterbalance the disadvantages of slower and more costly operation, longer loading time, and greater occupation of quay space. As pointed out above, the full advantages of crane loading in this respect cannot be obtained consistently with reasonable loading speeds, so that in actual practice, according to the writer's experience, breakage is little if any better than with hoists fitted with anti-breakers. As compared with hoists not so fitted cranes have the advantage of keeping coal, particularly domestic coal, in better condition.

The unwieldiness of crane loading is especially marked in dealing with bunkers, the special difficulties which arise in connection with which have been pointed out already. If it is difficult to get the chute of a hoist into the vicinity of an awkwardly-placed hatch it is clearly much more difficult to get a wagon into such a position and tip it there; also it is almost impossible to use with cranes any such temporary fitments as are employed when bunkering from hoists. The rate of loading bunkers with cranes therefore frequently falls very low indeed and heavy delays are incurred. This is an additional reason for discontinuing the use of cranes in the various districts above-mentioned.

Coaling cranes may be either fixed or travelling. The wagon cradles for fixed cranes may be sunk so as to bring the rails flush with the running rails, which in this case are interrupted to allow for framing contained in a pit or they may be above ground, and portable, with the rails

Part I appeared in our January 7 issue

reached from the running rails (which are not interrupted) by ramps at either end of the framing; the whole of the latter is in this case above running rail level. The cradle may be carried on rails of its own of different gauge from the running rails; to carry it from the running rails is for obvious reasons unsatisfactory though feasible. A better arrangement is to leave it unwheeled and to move it when required by the crane, locating it on the running rails by brackets or other fitments made to engage them. Even so the ramps are fairly steep so that wagons must be worked up them and controlled on the cradle by capstan. So far as the writer is aware no alternative is available. As the cradle may be double-ended and readily turned with the wagon (which, of course, must be the end-door type) a turntable is not strictly essential, but it is much more convenient and it gives faster working with less manual work; in layouts where the feeding lines come down at right angles to the quay-face a turntable is necessary in any event.

Only the portable type of cradle, of course, is suitable for use with travelling cranes. Besides having lifting and travelling motions the cranes need only a slewing motion but the provision of a derricking motion will undoubtedly be found an improvement.

Wagon Movements with Cranes

As with hoists, the layout of full and empty wagon roads, and the extent to which gravity movement may be utilised, depends on the conditions of the site.

Where the feeding roads run parallel to the quay face, as they must do with cranes of the travelling type, they cannot be graded, and wagons must, therefore, be moved by capstan. The best practice in such cases is for the wagons in the immediate vicinity of the crane to have continuous movement in the same direction; the empty wagon is delivered from the other end of the cradle to that from which it came on as a full. If, thereafter, the movement of the empties must be reversed to return them to the running roads over which they were brought in, they are capstaned over a set of points at the end of the crane road. Where obstruction is not caused to access to the quay faces the full wagon roads may be graded, but it is exceptional for both to be.

With fixed cranes, or where the travelling movement is short, the wagon roads are frequently at right angles to the quay face and they terminate in the turntable which leads to the cradle. In such cases the gradient is practically always in favour of the full wagons but may be against the empties. It is usual to work down a "raft" of 7 to 10 wagons to the near vicinity of the crane, and thence run the wagons forward singly. In some cases known to the writer special capstans having two diameter bollards are used for the dual purpose of moving the "raft" at moderate speed and the single wagons, including the return of the empty, at the high speed of 700 ft. per min. Here, for reasons connected with the site, the length of the single track between the points and the turntable over which both full and empty wagons had to run, was considerable, and the high speed of movement over it was essential.

Conveyors

The conveyor is the most recently developed coal-shipping device; its operating sequence is to empty the wagon into a hopper by either end or side tipping; then to raise and convey it by moving belts to a point where it can be delivered by chute, or other more elaborate device, into the ship. Delivery from the conveyor is continuous and it can be of very high hourly capacity; wagons are dealt with by fast-working easily-controlled machines at a point which need not be closely adjacent to the quayside, but may be sited to facilitate a good sidings layout utilising gravity in moving wagons and especially in clearing the empties, so that they can be very rapidly dealt with; another advantage is that points of delivery into the ship can be made variable over an area extensive both in length and breadth; this reduces trimming and enables the delivery chute to be of such shape and dimensions that bunker and other hatches, normally difficult of access, can be more easily reached, much more easily than with the other two appliances; this eliminates much special and manual work, thus greatly speeding up the rate of coaling and of dealing with ships.

Yet another advantage of conveyors is that they put less weight on the quays, especially near the quay face, than either hoists or cranes. On the other hand, the conveyor in itself takes up a great deal more room than either of the alternative appliances, and although this is to some extent offset by a reduction in the rail tracks necessary, it has not been found possible always to apply conveyors where it was desired to do so; the difficulty has been a lack of room in suitable directions. This difficulty was overcome in one installation by substituting a hoist of the locomotive coaling type to feed the "boom" or final shipping conveyor belt for the main belt.

The earliest railway use of conveyors so far as the writer is aware was by the North Eastern Railway at Hull, where two old hoists were converted to conveyors. These were situated on a quay face at right angles to the direction of the feeding and empty-wagon tracks; the wagons were end-tipped into a hopper which fed a conveyor belt rising to a point inside the framing of the hoist, which was retained. Here the coal was discharged into a chute placed at right angles to the belt and feeding into the ship's hold.

Flexibility and Ease of Adaptation of Conveyors

Conveyors can be adapted with much greater facility than either hoists or cranes to sites which present difficulties; for example, they can, when necessary, pass over rails, roadways, canals, and so on, to obtain access to a quayside from a yard otherwise separated therefrom in which the wagons are dealt with. They are extremely flexible in the sense that a variety of layouts is possible according to the individual site, duty, and operating conditions; in contrast the other two types of appliances require that sites be chosen and rail tracks laid out to suit their special characteristics.

For example, the initial survey for a fairly recent installation for bunkering trawlers made it clear that to suit the site and rail tracks on the one hand, and to attain the operating features required to serve the hatches of each of two trawlers lying alongside each other, on the other, a design embodying special and in some respects new features would be required. As a basis for consideration and discussion a scheme to meet the conditions was put forward more or less on the spot. As actually put down and set to work the machines were substantially in accordance with this original conception of their form and methods of operation.

Constituent Parts of Conveyors

The constituent parts of a conveyor are considerably more numerous than are those of the two alternative types of plant as also are the power-operated motions of these parts, especially those associated with delivery of the coal into the ship. It is, however, this very multiplication of these motions that confers on the conveyor its flexibility, that is to say, its wide area of delivery, its ease of access to points awkwardly placed, and its mobility, which makes for a reduction of trimming and high sustained loading speed. In the multiplication of these motions advantage is taken of the ease of application of electric drive, an especial point in favour of which is that the main motions, namely, those of the belts, are rotary and continuous. It is true that the tippler demand is intermittent and requires comparatively high power but the demand does not approach that of an electrically-operated hoist in respect of either peak current or duration.

The coal is emptied from the wagon into a hopper by a tipper which may be of either the side or end type. From the hopper the coal is drawn by a feeder which may be of the jigger type, but is generally, and in the writer's view, preferably of the apron type; this may be of the metal plate variety but according to the writer's experience a rubber belt is successful and better. The feeder delivers on to the main belt which must be of ample width for the quantity of coal it is intended to handle; it is inclined upwards at an angle not exceeding 24 deg. to terminate in a structure on the quayside at, in general, roughly the mean height for delivery into the ship. The actual delivery height varies with varying conditions of tide and state of loading; in some cases, where this variation is wide, the quayside end of the main belt may be supported with the boom (referred to below) and its belt in a rising and falling frame carried in the main fixed structure. The coal is generally taken off the main belt by a take-off plate or chute which should be as short as possible; this delivers on to the belt that carries the coal on to the ship, a belt relying for its support on the structure already referred to as the "boom." This boom is arranged to slew fore and aft of the ship through a considerable angle, and to rise and fall to give varying heights of delivery as tidal conditions and the flotation of the ship may require. It must also be capable of being triced up to clear the quay face when the conveyor is out of use. In some installations the boom is made telescopic; this adds to the range of movement and allows of access to hatches without ships' rigging having to be cast off.

Delivery by chute from the main belt on to the boom belt, of course, must take place over the point round which the various movements of the boom centre. In some cases the coal falls directly off the boom belt into the hold but in general there is a further chute taking coal off the boom belt and delivering it into the hold. This chute should be (but is not always) at least partially rotary so as to give some considerable fore and aft and athwartships variation; in most of the plants with which the writer has been associated it was adjustable through the complete circle. Thus with a throw of 8 to 12 ft. it was by itself able to trim the coal over quite a large area without boom movement, and it enabled delivery

to take place for an appreciable distance round the hatch openings actually below the deck. The possibility of using the boom with this chute turned at any angle is of material help in reaching awkwardly-placed bunkering manholes round deck and other superstructures. In some cases the boom belt delivers into an anti-breaker; where this happens the distributing chute generally functions at the bottom of the anti-breaker, of which, in one instance known to the writer, it forms an integral part.

The foregoing, it is believed, will have made it clear why the conveyor is so much more flexible than alternative appliances and how it is able to cover a much greater area without movement either of the appliance itself or of the ship. To maintain a high speed of loading it is necessary to ensure that wagons which come up full, are emptied, and sent away empty, at a rate commensurate with that at which the belts can deal with the coal. This is a question of suitable track layout and appropriate appliances for moving and emptying the wagons.

As already indicated, coal is drawn by a feeder from the bottom of the hopper into which it is tipped; unless the feeder can work in coal which is very free and is in consequence under very little pressure, it should not be of the jigger variety, as this is liable by its reciprocating motion to cause appreciable breakage. It has the advantage, however, that in its delivery on to the main belt less fall is entailed than with an open feeder of the plate or rubber-belt type. Both the plate and the rubber-belt feeders are smoother in their action but, nevertheless, may be a source of breakage if the coal they take out is under the pressure of that above it. By carefully designing the hopper so that the natural flow of the coal is in the direction of the feeder along as smooth and obstructionless a passage as possible from the hopper bottom, this breakage may be minimised and indeed almost eliminated.

The design should be such that the coal flows out from the hopper on to the feeder, and is there brought to a stand at its natural angle of repose; then when the feeder is operated the following coal just follows up that removed without any dragging out. There is, however, one trouble that frequently has to be taken into account in the design of conveyors; fines have a different and much steeper angle of repose than coal in lumps. In the Rugby locomotive coaling plant, coal is fed out through slots, so that on the feeder it is largely relieved of the weight of super-incumbent coal; this might turn out on trial to be a very attractive arrangement for cargo-coaling plants.

A regulating valve of plate form working over and down on to the feeder is sometimes used to control the coal flow, but it should be obvious from what has been said above that this is an unsatisfactory device. Left to regulate itself, the flow of the coal, and the amount fed on to the belt, would vary greatly according to the grade of the coal; the proper method of controlling it is to vary the feeder speed. It is desirable that, say, four speeds should be provided; these should be under the direct control of the operator controlling the plant as a whole. The speed should be chosen to suit the grade of coal to be dealt with. A ratio of three to one between the highest and lowest speeds with about 45 per cent. rise per step was found satisfactory on one plant which had two speeds on the belts. The variation can be given by mechanical change-speed gear but can probably be better provided and more easily operated by a variable-speed motor, perhaps of the commutator type.

The belts should be wide and troughed except at take-off points, and should not have to be run at too high speeds. It is easy to work them at a rate of 600 tons an hr. or more without exceeding, say, 400 ft. per min. on the main and 450 ft. on the "boom" belt. It is advantageous, particularly from the breakage point of view, to give the belts two speeds, using the lower for lump coal with which at half speed more than half the rated capacity may be obtained. Care should be taken in design to ensure that there is no pulley where coal is received on to a belt; otherwise there will be impact of the coal on the hard pulley surface through the belt and consequent breakage, also a tendency to cut the belt. The belts should be of ample width, say 4 ft. for 600 tons per hr. It is generally considered unsafe to place the take-off plates or chutes over which the coal is delivered from belt to belt higher than the centre line of the pulley over which the coal is being delivered, in case they dig in, but this involves a drop and preferably they are placed higher. This is practicable if the belt is endless, that is, with cemented joints instead of belt-fasteners, but on belts using the latter this is definitely unsafe; the objection is the risk of the plate catching the fasteners. Damage can be caused by foreign bodies in the coal, such as bottom boards of wagons, or other timber with or without projecting nails, and is not infrequent. The take-off plate may catch in the belt should there be any slight thickening at the joint.

Endless-belt joints are made by cementing the various layers together, layer by layer, in an overlapped sequence; the whole is then vulcanised. This is a job requiring skill and practice as well as a special appliance for vulcanising; it is generally done by the makers of the belt, but in order to keep important plants in commission, more especially in districts where there is special liability to damage from foreign bodies in the coal, it is worth while to keep a vulcaniser of suitable size in the district and to train a man on the staff in its use and in jointing work. Slack in the belts when it develops is taken up by screwing back the terminal pulley in slide bars.

When, to minimise the fall of the coal, the take-off plate is mounted above the horizontal plane of the delivery pulley, it should be so constructed as to yield quickly and easily in the face of any obstruction and so avoid digging into the belts; the risk of this, though still remaining present, may be accepted for the sake of the reduction of fall so attained. The take-off should be faced with a short piece of belting riveted to it to engage with the belt; below the take-off, to clear fine dust from the belt, there should be fitted a scraper and a hard brush. If possible the design should allow of this dust running on to the next belt; if this is impracticable it must be passed on to the ship separately or it may be discharged into a hopper or wagon to be used otherwise. The preferable layout of any conveyor is one in which, but for the slewing of the boom belt and the final delivery chute, the coal would travel straight throughout, passing from the feeder to the main belt, and from the latter to the boom belt over the take-off plates. The plate between the feeder and the main belt is generally short and simple, but in view especially of the movements of the boom the plate or chute feeding the boom belt may have to be relatively long.

At this point a trouble already referred to arises. The angle of the chute ideally should be such as just to overcome the frictional resistance of the coal passing down it so that the latter just maintains its speed; unfortunately, this angle requires to be steeper for fine coal than for large because of the greater resistance of the former; the result is that the latter gains speed in passing down the chute. Though the boom belt is run generally some 50 ft. per min. faster than the preceding main belt, to counteract this the difference is not enough, with the result that the coal coming off the chute is travelling faster than that in front of it on the boom belt, so hitting it and causing breakage. This difficulty was overcome on one important plant dealt with by the writer by arranging for the conveyance under control of all types of coal from the one belt to the other. In place of the metal chute a rubber belt was fitted between the main belt and the boom belt. This was much thinner than the main belts so that it could run on small diameter pulleys. It was driven off the former at a speed in ft. per min. intermediate between the speed of this and that of the boom belt. A very short plate take-off carried the coal from the main belt to the new belt which was sloped at such an angle that lump coal would not run down it when it was at rest. In this way the liability of lump coal to accelerate, and of fine coal to stick, were both eliminated and the passage of all grades of coal from the one belt to the other was put under control, so that the impact of lumps behind on those ahead was prevented entirely. Because the fall from the new belt to the boom belt was through a relatively small distance, a take-off plate between them was judged to be unnecessary.

Because of the shortness of the transfer belt, the duty on it per ft. of length is very high, and as it is also thin it is likely to wear rapidly. This drawback is outweighed by the improvement effected, but the mounting and arrangement of the belt should lend themselves to its easy and rapid replacement.

The transfer belt, of course, is applicable only when the main and boom belts are in line except for small deviations due to the slewing of the boom. All points of possible impact arising from this slewing or otherwise should be cushioned with sponge rubber or similar material. Where, as may be necessary, the boom in its mean position is at right angles or approximately so to the main belt, a transfer belt cannot be used. In one right-angled plant with which the writer was concerned coal transfer was effected by a chute spiralled through 90°.

From the inner edge of the chute which follows a plain right-angled curve the bottom is banked up and widened more or less on the lines of a high-speed motor-racing track. Lump coal accelerates as it comes down the chute and it rises up the banking as it does so, expending its surplus energy in its rise and in taking a longer path. Unfortunately, it has to be turned down again by an exaggeration of the banking to almost vertical before it can pass on to the boom belt, but this scheme is at least partially effective, though not sufficiently so for a right angle between the belts to be considered as anything other than a feature to be avoided whenever possible.

(To be continued)

Electric Railway Traction—VI*

Brief review of foreign developments and reasons for following electrification abroad

By C. E. Fairburn, M.A., Acting Chief Mechanical Engineer & Electrical Engineer, L.M.S.R.

THE Swiss Federal Railways have a locomotive, shown here, of 12,000 h.p., which is about five times as powerful as any steam locomotive in this country. The Pennsylvania Railroad has many locomotives capable of developing about 10,000 h.p. and this is found not quite enough. Other countries have units almost as powerful. It may be asked what use are these high-powered locomotives since we, in this country, can work with much lower-powered steam locomotives. The answer is that abroad they wish to take heavier trains at higher speeds, and for the traffic conditions to be met in many instances they have found it economical to do so. To take an example in the States, the Virginian Railway normally hauls freight trains up to 10,000 tons over a range of mountains. To indicate the size of such a train it may be mentioned that a mineral train in this country is about 1,000 tons. The American trains are handled by several units operating together; only one crew is needed. Reference might be made to numerous other electric locomotives, but enough has been said to give a glimpse of what is happening outside this country.

Though most of this address has been devoted to railways, perhaps road transport should receive some mention. Everyone is familiar with the evolution of horse-drawn trams to steam-drawn trams, and then to electric trams; now the electric tram is being superseded by the trolleybus. The electric tram was, of course, the first serious example of electric traction. Its equipment consists of motors, resistances, contactors, and so on, generally similar to those on trains, except that the contactors are mounted in the driver's controller and are operated directly by the handle. There is nothing of special interest about the tram; it has fulfilled a useful purpose but as it is today being superseded in most places, no more need be said about it. As compared with the tram the trolleybus, with its pneumatic tyres, is much quieter. Its higher acceleration and freedom to choose its own path on the road are valuable features under modern traffic conditions, but generally it carries fewer passengers and is more expensive to run than the tram. The electrical equipment more closely resembles that of a railway vehicle than that of a tram, as individual self-closing contactors are used. There is generally one motor only.

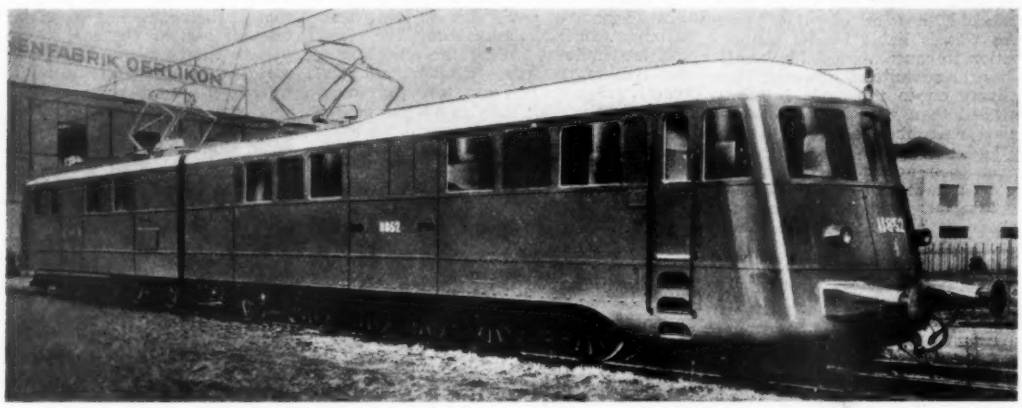
There are various other applications of electricity for purposes which might be called traction. There are rope-haulage systems in mines and goods yards using electric capstans and in America there is a tendency to regard large passenger lift installations as "vertical transport." Another application is the towing of barges by locomotives running along the towpath and schemes have been worked out for the electrification of the British canals with overhead supply conductors and motors driving propellers in the barges or tugs. One arrangement used to pull barges through a canal tunnel in Staffordshire has a "tug boat" fitted with an electric capstan by which it draws itself along a steel rope laid in the bottom of the canal. It can move as many as 24 barges at a time.

It may be of interest to give brief details of a scheme proposed in 1888 by Colonel Crompton, who died only recently, for the electrification of the London-Birmingham Canal. The scheme, which received very serious consideration, was to use a single trolley wire in each direction, the water itself forming the negative return. The supply proposed was 800-V. d.c. In those days there were normally about 500 barges on the canal simultaneously and allowing 6 h.p. per barge and a generating station every 10 miles, it was worked out that the maximum current at any part of the conductor would be 63 amperes. As the current was small it was proposed to use a steel conductor and it was calculated, if the losses were kept down to 7½ per cent., that 6,000 tons of steel wire would be used. The estimated cost was 5d. per mile per barge, including capital charges and depreciation. This charge, however, appears to have killed the scheme as it was not proceeded with.

In conclusion some reference may be made to the question of extending railway electrification. Everyone has heard of extensive electric-traction systems using powerful locomotives abroad and all have seen suburban systems grow in this country, why, then, it will be asked has electric traction made such limited progress on the main lines of this country? Reviewing the position abroad there are, for example, large-scale electrifications in France, Switzerland, Sweden, America, South Africa, Italy, and Japan and somewhat less ambitious schemes in Belgium, Holland, and other countries. It will be remarked that none of these countries is a "coal" country in the sense that Great Britain is. Switzerland, Italy, and Sweden have much water power and they also have to import coal for steam railways. By electrifying they make themselves self-contained and less dependent on other countries. In the United States many of the electrifications are due to the fact that a number of the big cities prohibit the bringing of steam locomotives into the city area because of smoke; consequently the lines within the city boundaries had to be electrified. It is not economical to electrify short lines and therefore electrification once begun has been extended to an economical length outside the cities. In due course these sections were joined up between cities as, for instance, between New York and Philadelphia, Philadelphia and Washington.

Again, many electrifications have been due to features of physical geography; for instance in New Zealand, where there is the longest tunnel of the British Empire, 5½ miles, the discomfort to the passengers and to the staff which would have been caused by steam locomotives made electrification practically essential. In South Africa there are heavy grades on the line for bringing coal down to Pietermaritzburg and only a 3 ft. 6 in. gauge. A steam locomotive could not be built big enough to haul

(*Concluded on page* 115)

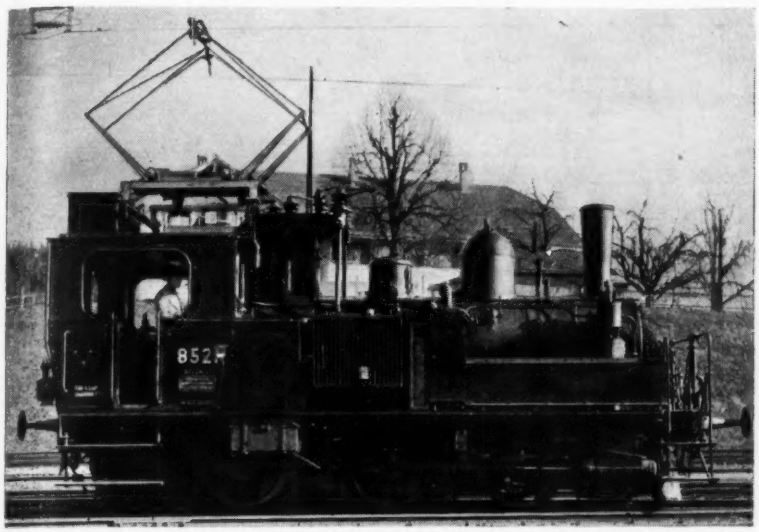


Oerlikon locomotive of 12,000 h.p. for use on the Swiss Federal Railways

* Abstracts from a Faraday Lecture. Part I was published in our issue of August 20; Part II in our issue of September 17; Part III in our issue of October 15; Part IV in our issue of November 12; and Part V in our issue of December 10, 1943

Electrically "Fired" Steam Locomotives

With the "electro-steam" shunting locomotives, of which two are in use in Switzerland, the saving in cost of fuel covers the cost of conversion in three years



FURTHER details have now been given in the *Bulletin* of the Swiss Association of Electrical Engineers, by Messrs. W. Müller and E. Meyer, of the construction and working of the two "electro-steam" shunting locomotives illustrated in our issue for July 23, 1943, page 85. The results are said to have answered all expectations.

The engines concerned are two from a series of 6-coupled tanks, built at various dates between 1895 and 1915, of which there are now 100 in service. Their ordinary working weight is 35 *tonnes*, to which 7 *tonnes* have been added by the new electric equipment. Of this 4·8 *tonnes* fall on the transformers. An additional leaf has had to be added to the locomotive springs. Boiler working pressure is 12 kg. per sq. cm. (171 lb. per sq. in.).

In 1941 only 5 per cent. of the total *tonne*-kilometres dealt with by the Swiss Federal Railways was steam hauled, but 150,000 *tonnes* of fuel were consumed—one third in shunting—or 20 per cent. of that burned in 1913, the heaviest year of steam working in the history of the system. Cost of coal had risen rapidly since 1939. Stocks were diminishing; imports were doing the same. The situation demanded serious consideration and the idea—advanced in the war of 1914-18—of raising steam in locomotives electrically was again taken up. (It was once proposed to work the Visp-Zermatt rack railway in this manner).

It was desired to avoid making reductions in the train services if possible: traffic had increased and new electric rolling stock of several types was built. More is under construction, but although electrification has been extended since war began, as for example on the Brünig route, Seebach-Wettingen and other lines, difficulties in obtaining materials tend to prevent further progress. No way of utilising all available vehicles can therefore be neglected. There are, it may be mentioned, 13 electric shunting locomotives in service, with 14 more under construction, and 42 electric "tractors" or "small locomotives."

For reasons of space and weight it was decided to distribute the equipment equally on each side of the locomotive. Each evaporator consists of a group of 16 steel tubes 37·5 mm. (1·47 in.) internal dia., through which water is passed from the lower part of the engine boiler by an electrically-driven circulating pump, run off a 36 v. accumulator battery charged through a rectifier. This accumulator serves for the cab lighting and other subsidiary functions. The heating current is passed through the tubes of each evaporator from its own transformer, fed from the 15,000 v. single-phase, 16⅔ cycles, trolley circuit, and delivering about 12,000 amperes at 20 v. from the secondary when the evaporator is working. (The current can rise to about 16,000 amperes when raising steam from cold). Glasswool and Cartabest insulation materials are used.

The water is circulated at the rate of 5 litres (8¾ pints) per sec. Each transformer primary can be cut out by its own switch and there is a main switch in the feed from the pantograph; there are no switches in the secondary circuits. The apparatus cannot be regulated and if too much steam is being raised it is switched out of circuit. An electric locking control prevents the evaporators being set working or kept energised if their temperature exceeds a certain figure or the primary current rises above normal. The ordinary firing arrangements are left undisturbed and can be reverted to at any time or used in conjunction with the evaporators. The latter are provided to meet average service demands, and for extra heavy peak work ordinary firing is employed as well. An engine, when fired electrically, is able to work away from the contact wire for intervals of about 20 min., a great convenience on occasion, and one man operation is possible even if a certain amount of ordinary firing has to be resorted to.

Full working pressure can be raised electrically in from 55 to 75 min. instead of the 2 to 3 hr. needed with ordinary fuel; the units consumed are about 600. From 75 to 90 kW. are consumed in meeting radiation loss. It is estimated that 300 *tonnes* of coal a year per locomotive will be saved, representing 36,000 fr. at present prices; allowing 1,000 fr. for maintenance of the electrical equipment, leaves 35,000 fr. saving on fuel which suffices to pay the conversion costs in three years, after which it can be set against the cost of electric power which is estimated to total 1,750,000 units a year at average user. Whether this will be sufficient to cover the additional expense for power involved in this method of working depends on a variety of circumstances and no definite conclusions can yet be reached. It is considered as sufficient justification for the step in present conditions that the initial outlay can be compensated for in a relatively short time.

The Swiss Federal Railways are placed in an exceptionally difficult economic position by the war and are compelled to resort to measures which normally would not be entertained for maintaining not only their ordinary train movements but their marshalling and shunting services; these latter play a particularly prominent part in a country placed, as Switzerland is, on important through goods routes.

NETHERLAND RAILWAYS NEW STOCK—It is reported that the Netherlands Railways have ordered from Dutch makers 11 new 4-car electric trains, similar to those provided for the most recent electrification work, which are to be used in the first instance to replace the out-of-date stock running on the Rotterdam-Hague (Scheveningen) section. This line was originally worked on the single-phase system, but was changed later to d.c. operation.

ELECTRIFICATION IN FRANCE.—A recent wireless broadcast from Paris stated that "the line from Paris to Port Bou has now been electrified." This presumably refers to completion of electrification of the Brive-Montauban line, French National Railways, conversion of which, as previously stated in our columns, had been expected to have been carried out by the end of 1943. This section represented a gap of about 100 miles in electrified routes extending *via* central France from Paris to the Spanish frontier at Port Bou.

Electric Railway Traction—VI

(*Continued from page* 114)

sufficiently long trains. Today trains are run by from one to four electric locomotives coupled together to act as a single unit with only one crew. In addition to being able to haul long trains up steep gradients, the locomotives possess the additional facility of being able to brake electrically, thus getting savings in brake blocks, tyres, and electric energy.

Naturally the whole question of electrification in England is one of economics and at the present time our abundant and cheap coal is the factor mainly responsible for causing electrification in this country to lag behind that of some other countries.

(*Concluded*)

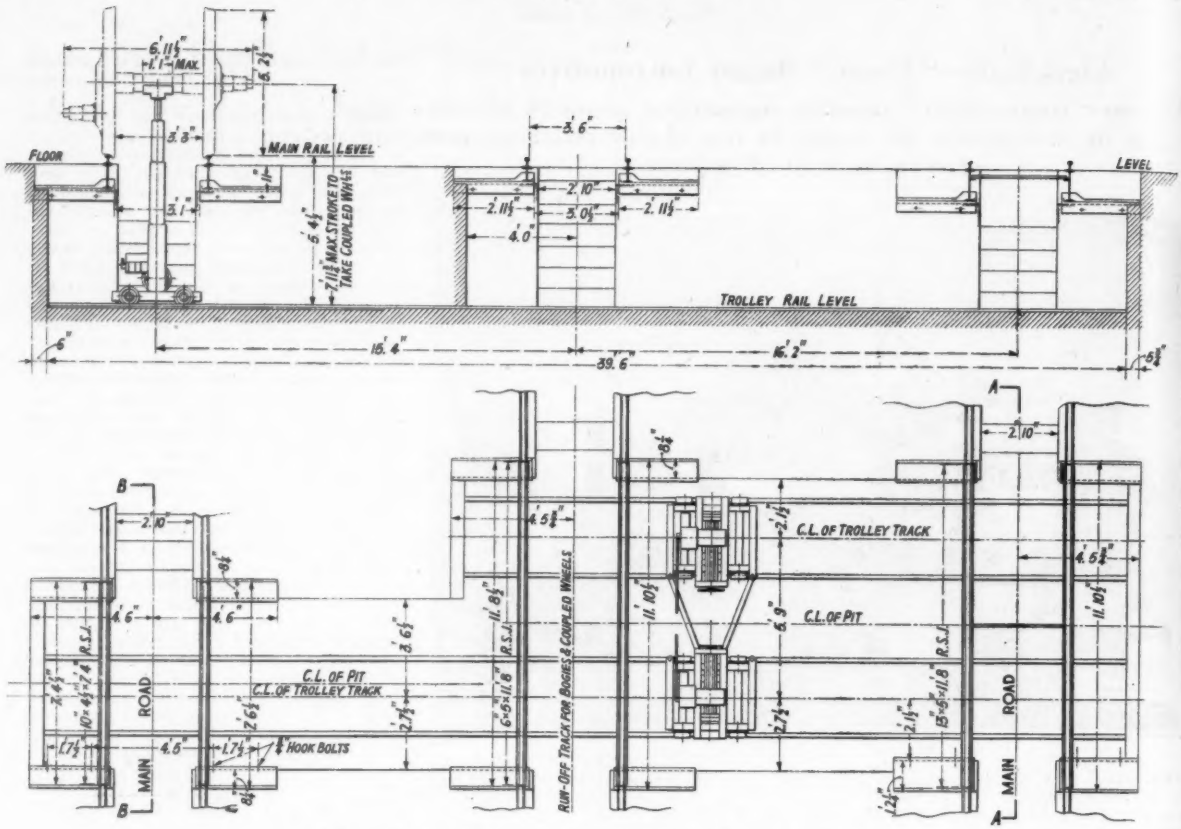
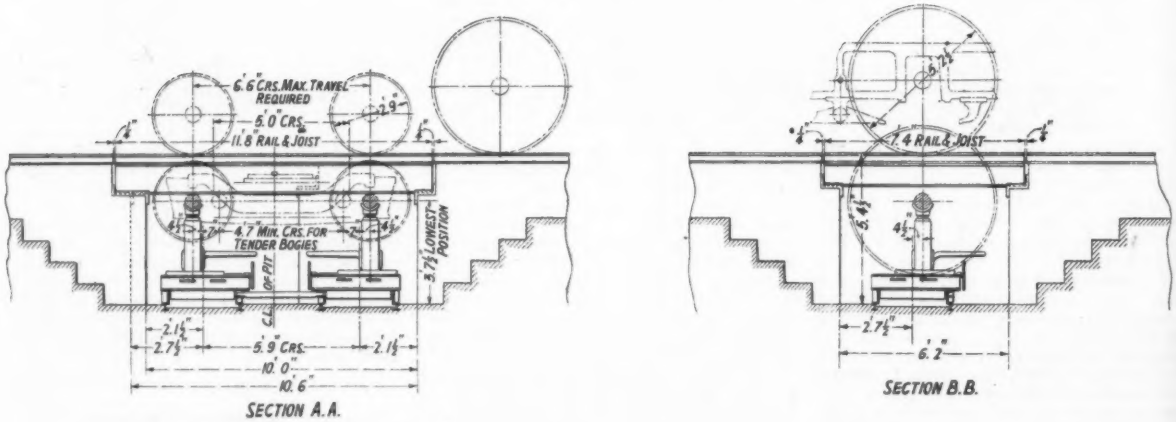
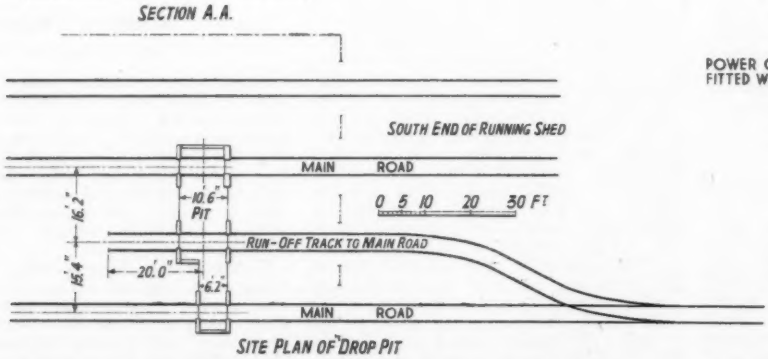


Diagram showing general arrangement of wheel-drop pit





POWER OF EACH UNIT - 15 TONS
FITTED WITH TELESCOPIC RAMS

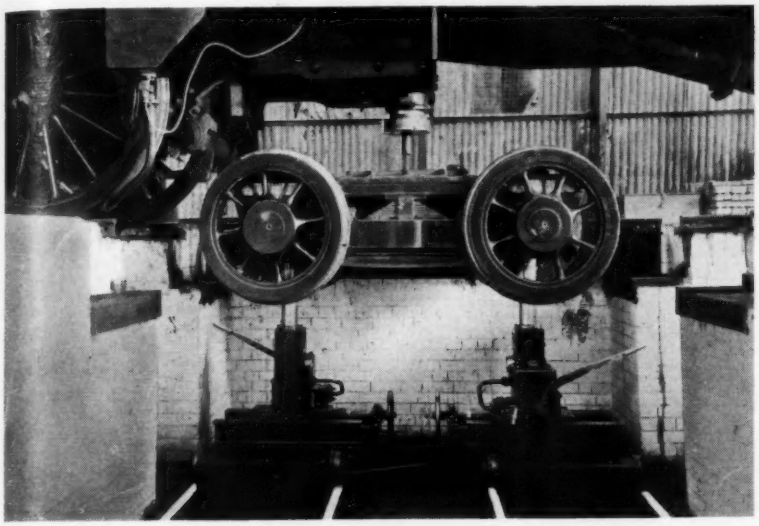
Cross sections of wheel-drop pit details showing principal dimensions and site plan

WHEEL-DROP PIT ON THE SUDAN RAILWAYS (*See article on opposite page*)

Wheel-Drop Pit on the Sudan Railways

Specially designed for dealing with complete bogies

By J. D. York, Assistant Chief Mechanical Engineer, Sudan Railways



THE Sudan Railways, north of Khartoum, run through some of the hottest and dustiest desert country in the world. The dust or sand forms a natural grinding paste on axle journals, hub liners, horns, etc., and the dust or sand covered rails cause heavy wear on wheel tyre treads and flanges. These conditions necessitate frequent axle-box repairs and tyre turning, and to deal with this work a locomotive wheel-drop pit of special design was recently installed in the running shed at Atbara. The main point of interest is that by the use of two jacks a complete bogie can be easily and safely removed and the accompanying illustration shows an inner bogie of a Beyer-Garratt locomotive in process of being lowered.

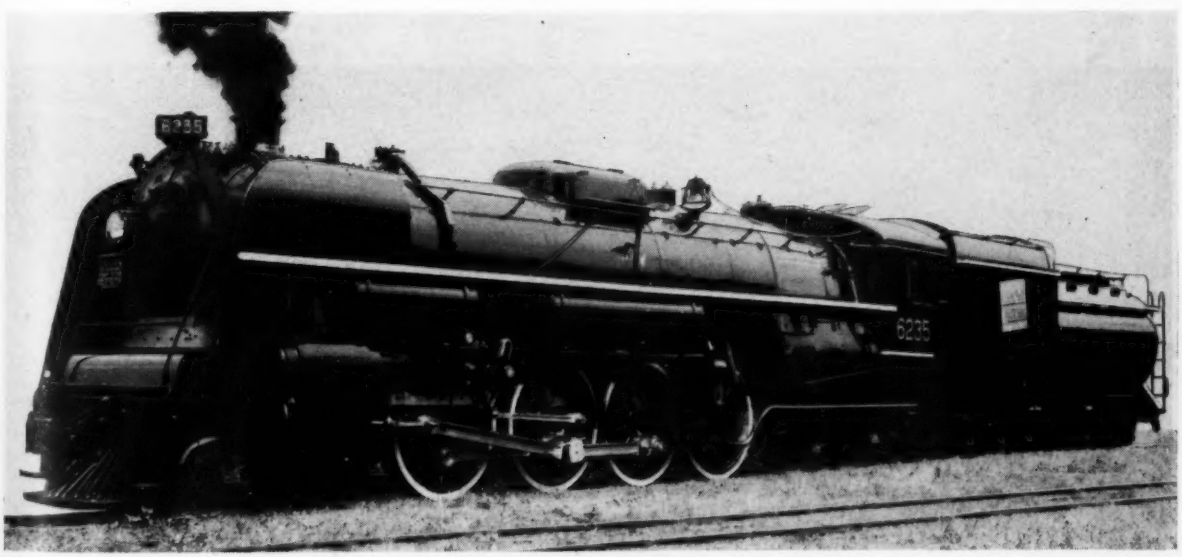
The drop pit extends across two lines; one accommodates the locomotive and the other is used as a wheel line on to which a bogie or a single pair of wheels, after removal, can be raised for necessary repairs at ground level. The drop pit has been so designed that either a bogie complete, a pair of coupled or carrier wheels, or a single pair of bogie wheels can be removed as desired.

The hydraulic jacks are supported on independent trolleys running on rails laid transversely along the bottom of the pit and were supplied by the Leeds Engineering & Hydraulic Co. Ltd. To accommodate the varying wheel bases of bogies, each jack is mounted on a traversing carriage across the trolley tracks and in line with the running shed lines. This adjustment enables bogies with varying wheel bases from 4 ft. 7 in. to 6 ft. 6 in. to be dealt with. When a single pair of wheels are to be lowered only one jack is used but when removing a bogie, both jacks are employed and the trolleys are locked together so that they travel on these tracks as one unit.

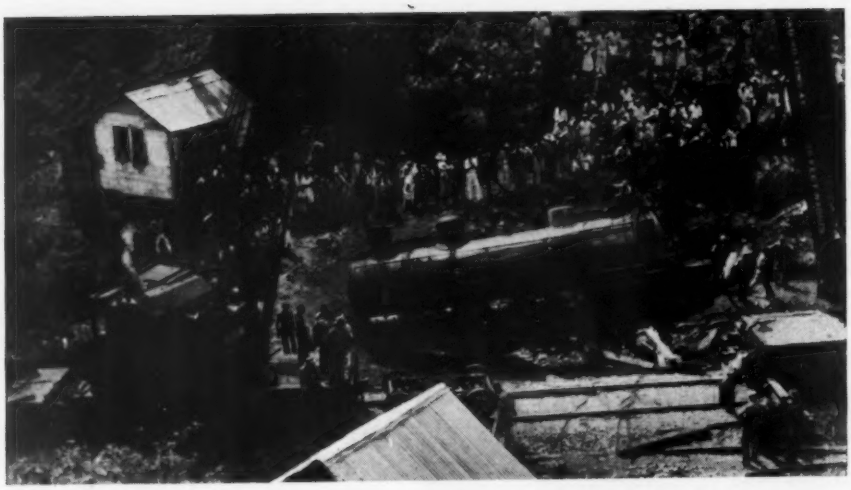
The hydraulic jacks, which have cast-iron crossheads for supporting wheel axles, are telescopic and are operated by a hand pump fitted with high- and low-pressure rams; the low pressure serves to raise the jack quickly and the high pressure is used for lifting locomotive wheels or complete bogies. A change-over valve is fitted to cut out the high- and low-pressure rams and a lowering valve is provided to control the lowering motion.

The drop pit, of which a diagram is given opposite, has greatly facilitated the expeditious attention to bogies, etc., the wear and tear of which is so unavoidably heavy under the severe conditions existing on this desert railway. For those classes of engines for which spare bogies are available it is now possible to change a complete bogie in less than an hour. It has also been useful with the advent of 4-6-4 + 4-6-4 Beyer-Garratt locomotives; the drop pit in this case is essential to avoid lifting or separating the units on these large articulated locomotives.

4-8-4 Locomotives for the Canadian National Railways



The first of a new series of 30 4-8-4 *tender locomotives of the "*6200*" class being built at the Montreal Locomotive Works for the Canadian National Railways (See reference in our issue of September* 24, 1943, *page* 319)



Left: The derailed locomotive being lifted by two cranes after the accident which occurred recently on the Jamaica Government Railway, an account of which is given on page 109

Right: A view of the locomotive from above

Below: Four of the wagons which ran past the overturned locomotive before themselves becoming derailed

A RECENT RAILWAY ACCIDENT IN JAMAICA

(*See paragraph on page* 109)

RAILWAY NEWS SECTION

PERSONAL

Sir Thomas Royden, Chairman of the London Midland & Scottish Railway Company, who received a Barony in the New Year Honours, has taken the title of Baron Royden, of Frankby in the County Palatine of Chester.

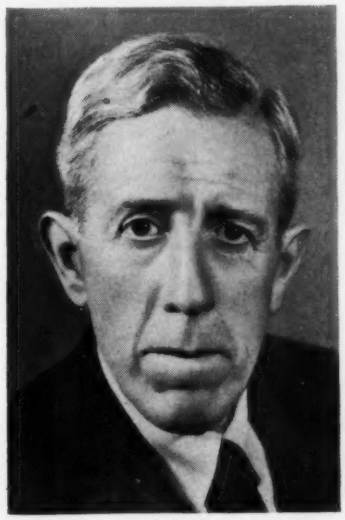
The Rt. Hon. the Viscount Runciman of Doxford has resigned his seat on the board of the London Midland & Scottish Railway Company.

Mr. W. B. Lorimer, Mr. J. B. Mavor, and Sir Frederick C. Stewart have joined the board of North British Locomotive Co. Ltd. Mr. Lorimer is the son of Mr. William Lorimer, the Chairman & Managing Director. Mr. Mavor is Managing Director of Mavor & Coulson Limited. Sir Frederick Stewart is Chairman of Thermotank Limited, Thermotank Engineering Co. Ltd. and Kelvin Bottomley & Baird Limited, and a Director of Brown Bros. & Co. Ltd. and other companies.

Mr. C. Barrington, who for some time has been prevented by ill-health from carrying out his duties as Director of Road Haulage, Ministry of War Transport, has resigned his appointment on medical advice. Mr. P. J. R. Tapp, M.C., who has been acting during Mr. Barrington's absence, has accepted appointment as Director of Road Haulage.

Mr. T. D. Slattery, whose appointment as General Traffic Manager for the Associated British & Irish Railways Incorporated in the U.S.A. and Canada was recorded in our January 28 issue, succeeds the late Lt.-Colonel Clive Mansfield Turner. Mr. Slattery's early training was gained in the Manchester area of the former Lancashire & Yorkshire Railway, and after several years' experience at goods and passenger stations he was engaged in various departments of the District and Headquarters Offices. On the formation of the L.M.S.R. he was appointed to the personal staff of the General Superintendent (Passenger Commercial) at Derby H.Q., and in 1928 took up a position as L.M.S.R. Travelling Passenger Agent in the U.S.A. and Canada. He was associated closely with the tour of the Royal Scot through the United States and Canada in 1933, travelled with it throughout, and later was the recipient of a memento of the occasion from the directors. On the merging of the British and Irish railway companies' interests on the North American continent, Mr. Slattery became responsible for the "field" work in the group companies' interests. In 1936 he was appointed Passenger Assistant to the District Goods, Passenger & Docks Manager, Barrow, and in November, 1938, he became Deputy Research Assistant to the Chief Commercial Manager. He was one of the "first fifty" selected to attend the then newly-inaugurated L.M.S.R. School of Transport at Derby in 1938, and subsequently lectured there on commercial subjects. On the outbreak of war, Mr. Slattery was posted to emergency work in London, and since has been engaged on special assignments connected with the war effort. When he goes to take over his new responsibilities in New York he will be returning to a country in which he has an enviable reputation in railway, steamship and tourist circles.

Mr. Francis Goodricke, Assistant Advertising Manager, London & North Eastern Railway, who retired on January 31



Mr. Francis Goodricke

Assistant Advertising Manager, L.N.E.R., 1924-44

on reaching the age limit, joined the North Eastern Railway in 1894 and served in various departments; he came to London on the amalgamation of the constituent companies of the Eastern Group, and was appointed as from January 1, 1924, to the post he has just relinquished. For over twenty years Mr. Goodricke's role was to assist Mr. W. M. Teasdale (1923-1927) and Mr. C. Dandridge (since 1928) in the general conduct of affairs and, to use his own phrase, "to keep the wheels turning." His relations with these two officers were of the happiest and they gave him their confidence on all occasions. In his turn, Mr. Goodricke bent his efforts towards acquainting everyone in the department with each scheme of operation afoot, so that its success could be backed by a team spirit. The L.N.E.R. Advertising Department is of a self-contained all-line kind; detached from other departments, it acts for them all through its H.Q., area, and district officers, and lets space direct to advertisers. The appearance of all L.N.E.R. property so far as advertisements are concerned is the responsibility of the Advertising Manager. Co-operation with the other British railways, the London Passenger Transport Board, road companies, steamship companies, and other bodies at home and abroad always appealed to Mr. Goodricke. He believes that future prosperity lies in active collaboration between all transport interests whose publicity will be directed, not against each other, but to the encouragement of movement of mankind and material by the best available means. On looking back on a long and enjoyable career, Mr. Goodricke pays tribute to all railway colleagues and others whose friendship and help have meant so much.

ENGINEER & RAILWAY STAFF CORPS

The following promotions and appointments were published in the Supplement to *The London Gazette*, February 1, 1944, under the heading, Territorial Army—Royal Engineers:—

Engineer & Railway Staff Corps.

To be Colonels: Lt.-Colonel E. J. Missenden, O.B.E.; Lt.-Colonel Sir J. Douglas Ritchie, M.C.; Sir William Valentine Wood; Major Allan Stephen Quartermaine, C.B.E., M.C., M.Inst.C.E.

To be Lt.-Colonels: Major M. G. J. McHaffie, M.Inst.C.E.; Keith Walter Chamberlain Grand; Gilbert Matthews; Alfred Jonathan Lyddon, C.B.E., M.Inst.C.E.; Henry John Green, O.B.E., M.C., M.Inst.C.E., M.I.Mech.E.; Charles Edward Fairburn, M.A., M.Inst.C.E., M.I.E.E.; Major John Cumberland Landale Train, M.C., M.Inst.C.E.

To be Majors: William Sebastian Graff-Baker, B.Sc.; William Cecil Clemens, M.Inst.C.E.; Arthur Dean, M.Sc., M.Inst.C.E.; Lt.-Colonel Harold Rudgard, A.M.I.Mech.E.

Mr. T. D. Slattery

Appointed General Traffic Manager,
Associated British & Irish Railways Incorporated, U.S.A. and Canada

Mr. R. M. Holland-Martin

We regret to record the death on January 27, at the age of 71, of Mr. Robert Martin Holland-Martin, C.B., F.S.A., Chairman of the Southern Railway Company. His railway connection dated from 1910, when he joined the board of the former London & South Western Railway Company; he became a Director of the Southern Railway Company on its formation, and was made Deputy-Chairman in 1932, and Chairman in 1935. Mr. Holland-Martin was born on October 10, 1872, the son of the Reverend Frederick Whitemore Holland, and Penelope, daughter of Robert Martin, of Overbury Court, Tewkesbury, and was educated at Eton and Trinity College, Oxford. In 1911 he was created C.B., and he took the surname of Martin in addition that of Holland by Royal licence dated August 14, 1917. Mr. Holland-Martin was Deputy-Chairman, and had been Chairman, of the Railway Companies' Association. He was a Deputy-Chairman, and Chairman of the London board, of Martins Bank Limited, with which his family for long has been associated, and was President of the Institute of Bankers, 1929-31; he served for thirty years as Honorary Secretary of the Bankers' Clearing House. His influence in banking and financial circles, in which his kindness, good temper, and his desire to promote goodwill and co-operation, played so large a part, will be greatly missed. He was on the boards of the Gas Light & Coke Company and other concerns, and was a Governor of Guy's Hospital, and a Fellow (for many years Treasurer) of the Society of Antiquaries. He was Chairman from 1925 to 1932 of the County of London Territorial Army & Air Force Association, and was Sheriff of Worcestershire in 1938; he was for many years Honorary Treasurer of the Political Economy Club. In spite of his age he was Southern Railway Home Guard No. 1, and for some time took his turn in helping to guard a signal box. One of his sons, Mr. Edward Holland-Martin, has continued the family tradition by becoming a Director of the Bank of England. By Mr. Holland-Martin's request, the funeral was held privately, and no memorial service is being conducted.

(*See editorial note, page* 101)

The late Mr. Robert Holland-Martin
Chairman, Southern Railway Company, 1935-44

Appreciations

By the loss of Mr. Robert Holland-Martin, the Southern Railway has been deprived of a great leader, who was regarded with affection up and down the line. He liked to refer to the Southern Railway as a family, of which he was the head, and it can be truthfully said that no one could have done more to promote the family feeling than he did.

In matters affecting the welfare of the staff he was particularly interested, and he never lost an opportunity of visiting all parts of the line or attending a railway function. On these occasions his charm of manner and sympathetic interest won him deserved popularity. His energy and cheerfulness were an inspiration to all, and those of use who saw him frequently can only compare his loss to that of a near relative.

Co-directors, his colleagues of the other railway companies, railway officers, staff and the public alike would testify to the fact that Mr. Holland-Martin's kindliness and enthusiasm smoothed many a ruffled situation and gave impetus to many a flagging ideal. I feel sure he left us as he would have wished to, while still in harness, for he was not the type even to contemplate inactivity, and when from time to time I have asked him to spare himself, he always brushed such suggestions aside with a smile, and continued to carry on his work with unfailing energy.

Although he had so many interests, banking, farming, archæology, art and charities, to mention but a few, one could not help feeling that latterly, particularly, his primary interest was the Southern Railway. We of the Southern can therefore pay no finer tribute to his memory than to be strong in our determination to increase the bonds of understanding and good fellowship between all ranks of the "great Southern Railway family" of which Robert Holland-Martin was such a distinguished leader.

E. J. M.

The many friends of Rob Holland-Martin will need no telling of the loss that his death means to them. His ever-ready interest in their doings rather than in his own, his ever-ready support for any project that made for more happiness or more beauty in the world, his ever-ready sympathy and help for those in trouble of any kind—these are qualities we shall not forget. What I wish more particularly to record here is the loss suffered by that wider circle of financial and commercial enterprises among which he moved. His entry into any discussion meant that pettiness, personalities, meanness, the seeking of advantages, commercial "cleverness" vanished from the picture. What was right? What was fair? What was human? What if possible was generous? These were the only considerations with him. Today it is more important than ever that these ideals should permeate all relationships. There can be no better way of serving his memory than by spreading the example of these, his high ideals, and no memorial would please him better.—*A friend, writing in "The Times."*

Active in mind and body, he was always occupied, yet he never lacked time for countless acts of kindness and generosity to the elderly and to those in trouble, or to give friendly and encouraging advice to the young. A great collector of things and of information, he gave abundantly. To Rob life was a business of delight which he pursued with great strength and, in the last few years particularly, serenity of purpose.—*Extract from an appreciation by R.V.B. in "The Times."*

The late Mr. R. M. Holland-Martin, who was Southern Railway Home Guard No. 1, photographed in 1940 during a tour of duty

TRANSPORT SERVICES AND THE WAR—227

Busmen Teach Army Drivers

Since 1940, London Transport instructor-drivers have trained 450 officers and 6,600 other ranks to drive motor vehicles.

Invasion " Shadow " Trains

The Railway Executive Committee recently announced that a complete " shadow " service of freight trains, which can be put into operation in a few hours, has been built up by British railways in collaboration with the Fighting Services. Material from Ordnance Depots and Stores, dispersed throughout Great Britain, may be required at any of many ports. The total probable journeys, running into thousands, have all been classified, routed, and timed, with the result that there exists a complete list of " shadow " services, any of which can be put into operation at short notice. Each train in the " shadow " service has a code number which indicates to the railway operating staffs, for instance, that " ABC 4217," a locomotive and 40 wagons, must be at depot " A " to load up and be ready to leave at 15.00 hours on a given day and travel, by a prescribed route, so as to arrive at destination at 06.00 hour the next morning.

Food Transport Economies

One of the important means whereby substantial economies have been achieved in the demands on the transport facilities of this country is in connection with the distribution of foodstuffs, and Mr. A. G. Marsden, Director of Transport, Ministry of Food, announced recently that these efforts have been so successful that they have resulted in a saving of some 3 million ton miles per annum. Broadly, the principle adopted was that goods should not be carried long distances when supplies were nearer at hand, and when goods of a like nature were criss-crossing one another over the country. All zoning and cognate transport economy arrangements have been based on the principle that areas where production is surplus to consumption shall not import, and that areas which are deficient shall not export but shall draw supplies from the nearest practicable surplus area. The arrangements have fallen into three broad categories, namely, those enforced by Statutory Rule & Order; those where the Ministry of Food itself controls the distribution; and those arranged within the trades concerned at the request of the Ministry of Food. It may be added that all food transport reorganisation has been made after consultation with the Ministry of War Transport.

With bulk flour, for example, the country is divided into 5 areas, which are subdivided into zones; and movements between zones or areas are controlled by permit. With self-raising flour, the country is divided into 10 zones, and inter-zonal movement is permitted only to specified deficiency zones. With biscuits, each manufacturer has been given a definite area in which to distribute. For chocolate and sweets, the country is divided into 4 zones, each of which is self-sufficient, with the exception of some minor inter-zonal balancing movements in bulk.

Additional economies have been effected by the operations of pooled distribution services, such as the Manufacturing Confectioners' Alliance, the Biscuit Delivery Pool, and the Wholesale Meat Transport Association; the last-named was absorbed in the Government War Transport Organisation in 1941.

General retail deliveries, involving foodstuffs to the extent of about 90 per cent. of the total, have been materially curtailed by the Ministry of War Transport in collaboration with the Ministry of Food.

Although it is not easy to evaluate in figures the consequential savings in movement which have so materially eased the strain on the national transport resources (as to do so would involve statistical calculations for which clerical labour is not available), the Ministry of Food has prepared the following details of approximate savings expressed in ton miles, both rail and road :

Commodity	Millions ton miles per annum
Cake & Flour Confectionery ...	3½
Biscuits	30
Sugar	10
Animal feeding stuffs	20
Chocolate & sweets	35
Soap	9
Margarine & cooking fats	10
Flour (bulk)	40
Flour (self raising)	5
Flour (biscuit)	2
Preserves	5
Cereal breakfast foods, pickles & sauces, and cider	2
Sausages & open packed meats	1
Beer	40
Fish	35
Wholesale grocery & provisions ...	8½
Tea	20
Total	276

It is estimated that the further savings in respect of retail distribution, and the wholesale distribution of milk and bread, bring the above total up to a figure of the order of 300 millions per annum.

Approximate savings expressed in millions of road vehicle miles per annum are : Milk collection 20·8, Milk retail 14·6, Wholesale grocery & provisions 5·5, and Biscuit Delivery Pool 8·0, a total of 48·9 million road vehicle miles.

Fuel saved in the distribution by road of milk, bread, groceries & provisions, beer, biscuits, chocolate & sweets, soft drinks, tea, and general retail trade, represents roughly 46,000,000 gal. per annum.

In respect of beer transport, as a result of better loading of railway wagons, the average wagon-load has been increased by 36 per cent. In other words, 3 wagons are now used instead of 4. Canal traffic in beer has been increased by 54 per cent., and coastwise traffic by 118 per cent., providing a welcome relief to the railways.

" Directed " Railway Workers

What appears to be an interesting issue for railway workers was raised before the magistrates at Southport on January 24, when two L.M.S.R. porters employed at Southport stations pleaded guilty to failing to obey Directions by the National Service Officer to take up new duties as pointsmen at L.M.S.R. sidings at Aintree. For the National Union of Railwaymen, Mr. A. V. Cunliffe said this was believed to be the first case of its kind in the country and was of considerable importance. The Minister of Labour was given unfettered power under the Defence Regulations and the Essential Work Order to direct persons to other work, but, said Mr. Cunliffe, the Statutory machinery for settling disputes between railway companies and their employees was retained by the Essential Work (Railway Undertaking) Order, 1941. These men were directed by the railway company to take up positions at Aintree, but said they were not prepared to do so. The railway company, instead of bringing into play the Statutory machinery, referred the matter to the Minister of Labour, who issued Directions. Mr. Cunliffe added that the trade union took the view that a great principle was at stake, and it proposed to pursue the matter further in another place. He suggested, therefore, that the magistrates should postpone sentence so that the matter could be investigated by the N.U.R., the L.M.S.R., and the Ministry of Labour, and the Chairman of the Bench agreed to this course, adjourning the case until April 21. He said that this was an unusual course, but was justified in his opinion during times of emergency as calculated to serve the best interests of the country.

Sleeping Cars and Housing Shortage

To assist in meeting the acute housing shortage that has resulted from R.A.F. raids on Berlin, the Germans are reported to have moved into the Berlin area a large number of sleeping cars taken from various great European expresses, mostly in France, and parked them on sidings.

Northern Ireland Rolling Stock

Details have now become available for publication of the rolling stock position in Northern Ireland after the severe air raid on the night of May 4-5, 1941, the second on Belfast. The York Road terminus of the L.M.S.R. Northern Counties Committee suffered heavily, and damage to rolling stock was severe ; 20 passenger carriages were burned out, and more than 250 wagons destroyed or seriously damaged. Locomotives escaped unscathed. The destruction of the carriage & wagon woodworking shop, the electrical shop, and the permanent way carpentry shop, saw mill, and timber store was complete.

In making good the heavy loss of rolling stock, gangs of men were specially recruited and organised to recover the re-usable parts of the damaged carriages and wagons. The L.M.S.R. arranged to take 150 of its wagons and 20 carriages out of traffic for transfer to the Northern Counties Committee, but the transfer could not be made immediately as the rolling stock of the parent system is obviously of standard 4 ft. 8½ in. gauge, whereas the N.C.C., like the other railways in Ireland, is of 5 ft. 3 in. gauge. When the necessary structural adjustments to meet the difference in gauge had been effected, the vehicles were shipped from Great Britain to Belfast. By the time they began to arrive, the recovery gangs had assembled sufficient wheels, axles, etc., on which to mount them, so that the vehicles were ready to be put into traffic upon arrival at the quayside. Ironwork salvaged from wagons was sent to the Great Northern Railway (Ireland) and the Great Southern Railways, which supplied the N.C.C. with 150 rebuilt wagons. With this timely assistance, and a further large delivery from L.M.S.R. stock, the whole of the lost rolling stock was replaced, and at present the N.C.C. has more carriages and wagons than before the war.

Pullman Sleepers for U.S.A. Troops

Further information is now available concerning the Pullman sleeping cars for troops described in the November 26 issue of *The Railway Gazette* (page 542), of which 1,200 in all, each with 30 berths, are now being built. Each car is of steel construction, with heavily reinforced ends, and weighs 34 tons (of 2,240 lb.) ; the cars are shorter than the normal American standard, and are less than half the weight of a standard sleeper of other than the latest lightweight types. The cars are equipped with high-speed bogie trucks and springing, and with standard Pullman gangway connections, and so are suitable for operation in any kind of train, but they have not the usual end doors and vestibules ; they are entered only by middle doors. Each car is thoroughly insulated, and provided with low-pressure steam-heating equipment, but not with air-conditioning. Electric

lighting is provided from storage batteries and not from axle-generator equipment, and separate circuits are provided for day and night use, the latter so arranged that the lights are shielded from the sleeping passenger. The berths which, as previously mentioned, are arranged in three tiers transversely, are provided with spring mattresses and standard Pullman bedding, including pillows and pillowcases, sheets, and blankets, and full Pullman service will be given, including a change of bed linen daily when the cars are in use. Each berth has a rack for a rifle, and two coat hangers. For use when the cars are marshalled in regular passenger trains, or are in the occupation of women's units, curtains are provided to draw the length of the car, shutting off the berths from the side corridor. To provide meal service for military trains, 400 kitchen cars, which similarly will be operated by the Pullman Company, are being built.

A " Victory Garden " Award for Railwaymen

The highest award of the United States National Victory Garden Institute, for the year 1943, has been awarded to the employees of the Union Pacific Railroad in recognition of their contribution to the " victory garden " programme. During the year, 27,000 U.P. employees undertook food production in gardens that they cultivated, either on their own land, or in 2,000 allotments on the company's property. The award is in the form of a plaque.

Argentine Motor Vehicle Export

On September 27, 1943, the Argentine Government issued a Decree amplifying and extending the scope of a Decree of the previous Government relating to the export of motor vehicles, accessories, and spare parts. The earlier Decree referred to new vehicles only. Under the provisions of the amending Decree the prohibition has been extended to include all types of motor vehicles, trailers, and their equipment, irrespective of their condition and whether they are new or used. A concession is made in the case of tourists, who will be allowed to take their cars abroad. In view of the present abnormal conditions, the Government has decided to adopt this measure to safeguard the national interests. The authority of the Rationing Control Board, the title of which has been changed to the Motor Vehicle Rationing Committee, has been extended to cover its new duties. The committee will include one representative of the Ministries of War, Marine, Agriculture, and Public Works, respectively.

Substitute Fuels and Lubricants in France

To meet present conditions, the Société Nationale des Chemins de fer Français has had to resort to a variety of substitute fuels and lubricants. In 1938 the fuel consumption of the S. N. C. F. was 8,900,000 metric tons of coal and 66,000 metric tons of liquid fuels, 33,500 of which went to operate railcars. In that year, railcars were responsible for 17 per cent. of the passenger traffic. As France is a coal-producing country, the coal situation did not become so critical as that of the supply of liquid fuels, which had been imported before the war. When foreign supplies of liquid fuels had become unavailable, stocks at the disposal of the S. N. C. F. dwindled rapidly, and early in 1943 amounted to a few hundreds of tons. Various measures had been taken to meet the position. Extension of electrification was considered, despite a shortage of materials, but did not make much headway except in the case of the Brive—Montauban line, the conversion of which is understood to be complete.

Accumulator operation on a large scale was not thought to be advantageous, as it had been calculated that 2·2 lb. (1 kg.) of accumulator weight would provide only 22 watt-hours of energy, a quantity which a railcar diesel-motor yields by burning an almost imperceptible quantity of gas oil. To work efficiently a railcar thus would need an unprofitable accumulator load of 8 metric tons. Moreover, an accumulator of this weight and size would need to be reloaded about every 62 miles (100 km.). On the other hand, accumulator working was found to be convenient for shunting units in marshalling yards and maintenance shops, and for 2½-ton electric lorries on collection and delivery services where the mileage covered by a vehicle did not exceed 21·7 miles (35 km.) a day.

Compressed town-gas was considered but found inconvenient for train or railcar working because of its low calorific value; it turned out satisfactory for shunting units and service vans. For the efficient operation of a standard-size railcar a storage-flask weight of at least 2,200 lb. would have to be carried. More promising was the prospect of using the methane gas obtained from the St. Gaudens wells in the oil and gas region of south-western France, worked by the Société Nationale des Petroles d'Aquitaine, which yield a gas said to contain 98 per cent. of methane. A calorific value of 7,200 cal. (28,500 B.Th.U.) per 35·317 cu. ft. (1 cu. metre) is claimed, enough to enable a satisfactory working efficiency to be obtained.

As the result of successful experiments with the St. Gaudens gas, several services in the Toulouse region have been operated from September, 1942, onwards by a Micheline railcar using that fuel.

The railcar has two diesel motors developing together 300 h.p. and hauls three trailers each weighing 25 metric tons. The seating capacity of the set is 400. The fitting of 40 flasks for the gas, which has to be compressed to 20 atmospheres, was necessitated; the compression ratio of the motors had to be reduced from 15·6 to 9½ by changing the pistons. Fuel injectors were replaced by armoured ignition plugs. The weight of the railcar in running order is increased from 51 to 55 metric tons. The gas pressure is lowered by reducing valves. A mixing device replaces the former air intake of the diesels. The maximum power obtained with the gas is 400 h.p., but the governor normally is set to a limit of 320 h.p. Gas consumption has been found to average 4,944 cu. ft. (140 cu. metres) for 62 miles (100 km.), compared with 233·2 lb. (106 kg.) of gas oil in the case of diesel operation. Methane obtained as a by-product of synthetic ammonia-manufacture has been found equally suitable.

On the Oujda—Colomb Bechar line (southern Algeria) ground-nut oil, kept at a temperature of 149° F. (65° C.), is used as fuel for the Saurer motors of the railcars. The power developed is 320 h.p. at 1,500 r.p.m., and good results are said to have been attained.

Producer-gas operation has been adopted extensively; where charcoal is used, the S. N. C. F. has found it convenient to produce its own requirements. Three plants for making charcoal have been set up at Tours, St. Dizier, and Persan-Beaumont, and old sleepers are carbonised by the Guillaume method in Geka ovens, enabling a yearly total of 2,600 metric tons of charcoal to be obtained; 250 metric tons is derived yearly from the wood of condemned vehicles. Some 40 carbonisation plants have been established at main stations, each comprising from four to eight Magnin ovens. These plants, which utilise wood from the thickets and hedges along the railway lines, yield a yearly total of 1,200 metric tons of charcoal. There are some mobile carbonisation-plants which consist each of three vehicles, one to carry the ovens, one dormitory coach, and one for supplies. These trains operate at stations where stocks of suitable wood have been accumulated, but where wood cannot be gathered fast enough to justify a permanent plant.

Particles of coal drawn through the boiler tubes of steam locomotives and accumulated in smokeboxes have been found to form suitable basic material for a substitute fuel for producer-plants. This dust represents about 1½ to 2 per cent. of locomotive coal consumption, and is a semi-coke with high ash-content. It is said that the best way to use it is to form it into briquettes through the admixture of peat.

Producer-plants have been fitted by the S. N. C. F. to many inspection coaches and road vehicles. Shunting tractors, the power of which is below 50 h.p., have been fitted with charcoal producer-plants; hard-coal producer-plants have been provided for tractors having a power of from 100 to 150 h.p. A few railcars have been fitted experimentally with producer plants working on charcoal, but these cannot haul more than one trailer.

Consumption of charcoal, although varying according to the type of vehicle and service performed, averages 264 lb. (120 kg.) to 374 lb. (170 kg.) to every 62 miles (100 km.). A reduction of 20 per cent. is obtained where a mixture consisting of 60 per cent. charcoal and 40 per cent. " gazolux " (a semi-coke from the Brusy coal mines in northern France) is used.

The following list shows the proportions in which substitute fuels are used for internal-combustion engines on the S. N. C. F.:—

	Per cent.
Producer-plants operating on :—	
charcoal and wood	42
mineral oil	4½
Compressed gas	30
Alcohol	1½
Gas oil and petrol	22

In 1938, the S. N. C. F. consumed 27,000 metric tons of lubricating oils and greases of all types, all of which was obtained from petroleum. At the present time, substitute materials only are used; even so, steps have been taken to reduce consumption. A 50 per cent. saving is stated to have been attained, partly by training staff to use lubricants sparingly, partly by improving lubricating devices, and partly by recovering used materials.

Three classes of substitute lubricants are used: (*a*) vegetable (castor oil, colza oil, and olive oil); (*b*) mineral (oils from hard-coal tar); and (*c*) synthetic, obtained through the hydrogenation of pine-cones. The most difficult problem was the lubrication of steam-locomotive cylinders; synthetic oils have proved satisfactory up to temperatures of 350° C., but their higher density has been found to exclude the use of condensation lubricators. Extensive tests with water-oil emulsions, stabilised through the admixture of triethanolamine, have been carried out; but no particulars of the results have been disclosed.

Western Australian Railway Results

A statement of comparative results of working of the Western Australian Government Railways for the five years ended June 30, 1943, issued in advance of the Deputy Commissioner's annual report, shows that earnings of the Railway Department during the year 1942-43 totalled £4,417,907, a record earning for any year, and an increase of £421,595 over the figure for the preceding similar period. Working expenses for the year amounted to £3,447,512, and after deducting interest on capital (£1,031,816), there was a deficit of £61,421, as against £62,477 in 1941-42. The operating ratio was 78·04 per cent. compared with 75·72 per cent. in the previous year. The capital cost of the railway system at June 30, 1943, was £26,715,886 against £26,824,674 at June 30, 1942, and the average mileage worked was again 4,381. Earnings an average mile worked were £1,008, and working expenses were £787. The percentage of net revenue to capital was 3·63, an increase of 0·01 per cent. Train-miles run totalled 6,469,660, earnings a train-mile were 163·89d., working expenses 127·89d., and interest 38·28d.

Of the increased earnings £247,681 was attributable to coaching traffic. Due to existing conditions very heavy passenger loading is being experienced throughout the system, and there was an increase of 2,559,654 in the passenger journeys for the year. Goods traffic decreased in tonnage and ton-mileage, but earnings from goods and livestock were £145,033 greater than 1941-42. There were substantial reductions in the quantities of bulk lower freighted traffic hauled, but increases in the higher freighted classes accounted for the higher earnings. Total ton-mileage of paying goods and livestock was 329,182,643, a decrease of 12,545,955 ton-miles; total earnings from goods and livestock traffic were £2,806,110, and the ton-mile receipt was 2·05d. pence.

In comparison with the previous year there were important variations in the quantities carried of particular classes of traffic. Local coal, coke, shale, and charcoal decreased from 243,178 tons to 209,098 tons, due to a reduced output from the local coal mines, and also greater consumption by the Railway Department which takes its supplies direct from the pit's mouth. Wheat decreased from 666,860 tons to 442,476 tons. This is a low-freighted traffic which in 1941-42 equalled 25·43 per cent. of the total ton-mileage, whereas in 1942-43 it was 17·94 per cent. only. Firewood increased from 83,777 tons to 133,055 tons. In the previous year large quantities of firewood were carried by road, but with fuel restrictions, shortage of rubber, etc., much of this traffic is reverting to rail. Local timber decreased from 332,600 tons to 276,989 tons. In fertilisers there was a decrease from 178,939 tons to 130,691 tons. This is a very low-freighted traffic, earning only approximately ½d. a ton-mile. Miscellaneous class, which includes road metal, ores, and minerals, decreased from 200,968 tons to 175,965. In "C" class there was an increase from 121,898 tons to 143,333 tons, and in other higher-freighted goods there was an advance from 134,166 tons to 301,344 tons. Livestock increased from 129,437 tons to 143,195 tons. It is interesting to note that of the total ton-mileage hauled 60·46 per cent.—including such items as local coal, hay, straw, chaff, wheat, firewood, local timber, fruit, vegetables, fertilisers, miscellaneous class, and grain—were carried at freights which earned less than the average ton-mile rate.

The heavy increase in working expenses in relation to the increased earnings was due to factors largely outside the control of the Administration and included such items as basic wage increases for the staff, £90,000; higher costs due to the necessity for more overtime and Sunday working, increased costs for coal and sleepers, £100,000, and increased cost of materials generally. Train-miles totalled 6,469,660, a decrease of 27,455 on the preceding year. There was an increase in passenger train-mileage, but the lower goods tonnage handled enabled a reduction to be made in the number of goods trains run.

WESTERN AUSTRALIAN GOVERNMENT RAILWAY RESULTS FOR THE LAST FIVE YEARS

Particulars	Year ended June 30—					1943 compared with 1942	
	1943	1942	1941	1940	1939	Increase	Decrease
Amount debited to capital account	£26,715,886	£26,824,674	£26,794,380	£26,736,299	£26,558,893	—	£108,788
Average number of miles worked	4,381	4,381	4,381	4,380	4,376	—	—
Miles open for traffic on June 30	4,381	4,381	4,381	4,381	4,378	—	—
Average capital cost a mile	£6,097	£6,122	£6,116	£6,103	£6,066	—	£25
Earnings	£4,417,907	£3,996,312	£3,571,828	£3,555,982	£3,599,143	£421,595	—
Working expenses	£3,447,512	£3,025,919	£2,757,891	£2,828,329	£2,911,570	£421,593	—
Surplus earnings over working expenses	£970,395	£970,393	£813,937	£727,653	£687,573	£2	—
Interest charges	£1,031,816	£1,032,870	£1,030,279	£1,028,014	£1,000,799	—	£1,054
Balance after paying working expenses and Interest—deficit	£61,421	£62,477	£216,342	£300,361	£313,226	—	£1,056
Working expenses per cent. of earnings	78·04	75·72	77·21	79·54	80·90	2·32	—
Percentage of net revenue to capital	3·63	3·62	3·04	2·73	2·60	0·01	—
To the average mile worked—							
Earnings	£1,008	£912	£815	£812	£822	£96	—
Working expenses	£787	£691	£629	£646	£665	£96	—
Interest	£235	£235	£235	£234	£229	—	—
Working expenses plus interest	£1,022	£926	£864	£880	£894	£96	—
Balance after paying working expenses	£221	£221	£186	£166	£157	—	—
Net return after paying working expenses and interest—deficit	£14·02	£14·26	£49·38	£68·57	£71·58	—	£0·24
Train-miles run	6,469,660	6,497,115	6,277,745	6,262,437	6,721,453	—	27,455
To the train-mile—							
Earnings	163·89d.	147·62d.	136·55d.	136·28d.	128·51d.	16·27d.	—
Working expenses	127·89d.	111·78d.	105·43d.	108·39d.	103·96d.	16·11d.	—
Interest	38·28d.	38·15d.	39·39d.	39·40d.	35·73d.	·13d.	—
Working expenses plus interest	166·17d.	149·93d.	144·82d.	147·79d.	139·69d.	16·24d.	—
Balance after paying working expenses	36·00d.	35·84d.	31·12d.	27·89d.	24·55d.	0·16d.	—
Net return after paying working expenses and interest—deficit	2·28d.	2·31d.	8·27d.	11·51d.	11·18d.	—	0·03d.
Passenger journeys	17,092,126	14,532,432	11,518,216	10,793,396	11,415,615	2,559,694	—
Tonnage carried—							
Paying goods	2,361,487	2,509,032	2,484,917	2,548,628	2,743,199	—	147,545
Departmental goods (non-paying)	483,831	477,104	541,157	539,101	673,769	6,727	—
Livestock	143,195	129,437	118,940	110,248	115,942	13,758	—
Total goods and livestock	2,988,513	3,115,573	3,145,014	3,197,977	3,532,910	—	127,060
Total ton miles—Paying goods and livestock	329,182,643	341,728,598	351,245,171	361,689,595	378,089,487	—	12,545,955
Average mileage each ton hauled	131·43	129·51	134·89	136·03	132·24	1·92	—
Earnings—							
Coaching (including mails)	£1,359,776	£1,112,095	£825,971	£725,340	£704,300	£247,681	—
Goods (including livestock)	£2,881,269	£2,736,236	£2,651,353	£2,744,719	£2,807,215	£145,033	—
Average goods and livestock a ton a mile	2·05d.	1·86d.	1·75d.	1·77d.	1·71d.	0·19d.	—
General miscellaneous (including rents)	£176,862	£147,981	£94,504	£85,923	£87,628	£28,881	—
Outstanding revenue on June 30	£321,936	£252,864	£158,373	£148,045	£104,706	£69,072	—
Rolling Stock on June 30—							
Locomotives	392	390	413	423	429	2	—
Passenger vehicles	441	449	445	445	475	—	8
Brake vans	217	220	230	236	213	—	3
Goods vehicles	10,743	10,754	10,972	11,003	10,887	—	11
Equivalent of goods vehicles in 4-wheeled wagons	13,050	13,064	13,343	13,396	13,276	—	14
Total carrying capacity exclusive of service stock (tons)	115,925	116,073	118,332	118,634	116,978	—	148
Average staff employed during year—							
On working expenses	7,244	7,133	7,137	7,539	7,711	111	—
Total	8,322	8,148	7,887	8,385	9,020	174	—
Population of State (exclusive of aborigines) on June 30	472,000	472,000	469,700	467,900	464,900	—	—
Mean population of State for year	470,000	468,800	468,700	466,500	462,592	1,200	—

Permanent Way Institution Diamond Jubilee Annual Meeting

The sixtieth annual winter general meeting of the Permanent Way Institution was held at the Institution of Civil Engineers, London, S.W., on Saturday, January 29, with the President, Mr. V. A. M. Robertson, C.B.E., in the chair. Some 200 representatives from the various sections attended, including three past Presidents, Messrs. R. Carpmael, S. L. Murgatroyd, and W. K. Wallace.

The Secretary, Mr. H. Janes, gave a report of the progress of the Institution for the year 1943. A great improvement has taken place as to section activities which had almost reverted to pre-war standard. This revival of interest was due in considerable measure to the encouragement of the President who made personal visits to many provincial centres. During the year two new Sections had been inaugurated, at Croydon and Bristol. In 1943 the Institution had enrolled 474 members, of which number 108 were from India. For home railways the figures were Southern Railway 119, L.M.S.R. 110, G.W.R. 78, L.N.E.R. 32, and London Transport 17.

Three *Journals* had been issued but the paper control continued to curtail size. It had been possible, however, to include eight papers and contributed articles as well as full reports of council and section meetings. The text book "British Railway Track" had been issued and the demand for it by members proved the necessity of such a work.

The Treasurer, Mr. F. Lawson, submitted a financial report which showed that the satisfactory position of previous years had been fully maintained in 1943.

Mr. W. K. Wallace then moved the re-election of the President, remarking that, as they had just heard from the Secretary's report, Mr. Robertson had done a great deal of hard work for the Institution during the past twelve months. In seconding the proposal Mr. S. L. Murgatroyd, who had himself been President in 1896-7, said he could look back on the 60 years of the Institution's existence. This existence was due to two things without which they would have failed. First, efficient officers, and secondly the assistance given by the railway engineers. On the proposal being carried with acclamation, Mr. Robertson said he gladly accepted the Presidency for another year and he looked upon his election again as a great honour. He took that opportunity of acknowledging the work and enthusiasm of the officers. Regarding sections, he had met the local officials who not only had busy jobs in their railway service but who spared the time for work in the interest of the Institution. Then they had the chief engineers, who by their interest had materially helped to increase the membership. Concerning the text book on permanent way, this was the result of some eight years' work, but upset by the war. It was a book which should prove of value in the railway engineering world. Although the book was the result of the labours of the Institution's Education Committee, one man had been responsible for its co-ordination, and he would place on record how much Mr. R. A. Hamnett had done in getting the book into shape for publication.

The President called attention to the fact that 1944 was the diamond jubilee year of the Institution and the committee which had been appointed under the chairmanship of Mr. S. L. Furnivall was formulating a programme of items to celebrate the occasion so far as existing circumstances would permit. He asked them all to do their utmost to recruit new members so that at the end of the jubilee year they could report a membership of no less than 3,500.

Vice-Presidents were elected as follow: *England*, Mr. B. Lloyd Davies, J.P.; *Scotland*, Mr. W. Paterson; *Wales*, Mr. C. R. Irving; *Ireland*, Mr. G. J. Murphy; *Sudan*, Mr. C. Mackinnon; and for *India* the nominee from Bombay & Western India Section whose name was awaited. The Secretary, Mr. H. Janes, and Treasurer, Mr. F. Lawson, were re-elected, and Mr. E. Bywater was appointed Assistant Treasurer.

Sympathy was expressed with the members of the Malaya Section, the majority of whose members were prisoners of the Japanese.

Mr. A. S. Quartermaine, C.B.E., Chief Engineer, G.W.R., then gave a talk on "Some Recent New Works on the Great Western Railway" followed by lantern views. Mr. Quartermaine dealt with the variations from normal practice during the construction owing to wartime conditions, and gave details of new lines, doubling or quadrupling existing lines, provision of running loops and new marshalling yards, etc. An illustrated summary of Mr. Quartermaine's paper was published in our February 26, 1943, issue.

At the conclusion the President thanked Mr. Quartermaine for his instructive address. Mr. Quartermaine had acknowledged the work of the practical staff of the engineering and signal departments but it could be gathered from what had been showed that there had been a considerable amount of guiding influence behind the work.

Canadian Locomotives for India and Jamaica

The Canadian Locomotive Company is carrying out an order for 75 and the Montreal Locomotive Works an order for a further 70 locomotives for the Indian State Railways. (Reference already has been made to these locomotives in *The Railway Gazette*, but previously no details were available). The engines are of 5 ft. 6 in. gauge and of the 2-8-2 type. Some of the leading dimensions are as follow:—

Cylinders (2), 21 in. dia. × 28 in. stroke.
Coupled wheels, dia. 5 ft. 0 in.
Boiler pressure, 200 lb. per sq. in.
Grate area, 47 sq. ft.
Weight in working order available for adhesion, 70½ (short) tons.
Total weight of engine in working order, 96 (short) tons.
Total weight of tender in working order, 62 (short) tons.
Total weight of engine and tender, 158 (short) tons.
Tractive effort, 35,000 lb.

These orders were placed in accordance with the recommendations of an Indian Supply Mission, of which the Consulting Engineers, Messrs. Julian S. Tritton and C. Fawcett, were the technical members. Also, by arrangement with the Canadian Pacific Railway, all inspection work in the construction of these 145 locomotives is being carried out by the staff of that railway, who are responsible for the specification of all materials used in accordance with the standards ruling on the C.P.R. Mr. J. M. Watson, of the Canadian Pacific Motive Power Department, is proceeding to India to supervise the erection of these engines on arrival in that country. They are being shipped in crates after preliminary erection and testing in Canada, for which also the C.P.R. is responsible.

That administration is also undertaking the inspection on behalf of the Indian State Railways of a large number of locomotive boilers and crank axles now being manufactured in Canada.

Also to the inspection of the C.P.R., six 4-8-0 locomotives and 84 vehicles (some passenger coaches, and the remainder representing goods rolling-stock) are being constructed by the Canadian Car & Foundry Company for the standard-gauge Jamaica Government Railway. Some leading dimensions of the locomotives are given below:—

Cylinders (2), 19 in. dia. × 26 in. stroke.
Coupled wheels, dia. 3 ft. 10 in.
Boiler pressure, 190 lb. per sq. in.
Grate area, 34 sq. ft.
Weight in working order available for adhesion, 60 (short) tons.
Total weight of engine in working order, 75½ (short) tons.
Total weight of tender in working order, 47½ (short) tons.
Total weight of engine and tender, 123 (short) tons.
Tractive effort, 32,870 lb.

(*See editorial note, page* 102)

Questions in Parliament

Wagon Supplies

Mr. W. Foster (Wigan—Lab.) on January 27 asked the Minister of Fuel & Power if he was aware of the short-time working at some of the collieries in the Lancashire coalfield due to the shortage of wagons; and whether he would consider giving instructions to all collieries to stock the coal, where practicable, on the surface, as was done in pre-war years in these circumstances.

Mr. Tom Smith (Joint Parliamentary Secretary to the Ministry of Fuel & Power), stated in a written answer: I am aware from the colliery returns that some collieries in Lancashire are sustaining losses of working time owing to shortage of wagons, and the general question of wagon supplies to collieries is one which is engaging the Government's closest attention. As to the second part of the question, it is still the practice for collieries to stack coal on the surface and colliery undertakings are being instructed to do this to the maximum practicable extent.

Post-War Road Policy

Captain L. D. Gammans (Hornsey—C.) on January 25 asked the Parliamentary Secretary to the Ministry of War Transport if he was in a position to make a statement on post-war road policy.

Sir Adam Maitland (Faversham—C.) also asked the Parliamentary Secretary to the Ministry of War Transport if he would publish particulars or plans of his department for the post-war construction of motorways.

Mr. P. J. Noel-Baker (Joint Parliamentary Secretary to the Ministry of War Transport): H.M. Government has considered on what lines the improvement and development of our highway system could best proceed after the war and it thinks that some preliminary indication of its general views would be helpful, both to highway and local authorities in framing their own plans, and to others who are interested.

Proposals to improve and extend the road system in the first place must be viewed in relation to the efficiency and development of our inland transport system as a whole. Such proposals must also be framed with full regard to the interests of

town and country planning, the location and requirements of industry, including agriculture, and other aspects of national development. My Ministry, therefore, will maintain contact with the many other departments concerned, as well as with the local and highway authorities.

In the Government's opinion, there is a clear case for extending the present trunk road system, and it has in mind, in consultation with the county councils, to frame legislation which would substantially increase the existing mileage of trunk roads (that is to say, about 4,500 miles) which is at present vested in the Minister of War Transport. Where a by-pass which forms a link in a trunk road passes through the area of a county borough (or in Scotland through a large burgh) it will probably be found right to vest this section also in the Minister.

Discussions will be commenced immediately with the highway authorities, to select the additional roads to be scheduled as trunk roads. We intend to continue the arrangements under which the existing authorities can act as the Minister's agents. To secure the full advantages of new developments, it may also be found necessary to plan some new trunk roads, where the line of the existing road is not satisfactory. The possibility of simplifying the present somewhat complicated system of grants to highway authorities is being considered.

Consideration has been given to the proposals made in various quarters for the construction of a new system of motorways, to relieve the pressure on our existing main roads. Although the Government does not think that there is sufficient justification for embarking on the construction of a widespread system of entirely new roads reserved exclusively for motor traffic, it is satisfied that it will be expedient and economical to construct suitable lengths of roads of this type, where engineering and traffic considerations make this course preferable to the extensive re-modelling of existing roads, in an attempt to make them more suitable and safer for mixed traffic. In selecting lengths of road for this treatment, the Ministry would be guided by the proper development of our transport system as a whole, by the convenience of road traffic, and by sound principles of town and country planning. Due regard would be paid to cost and amenity.

The roads of the country on the whole have stood up well to the heavy demands of war, but there will inevitably be large arrears of work, both of maintenance and improvement, to be carried out, as conditions permit. The rate of execution of the highway programme must be adjusted from time to time to general economic conditions, but, without imposing any undue rigidity, the following order of priority will be a good guide during the transitional period :—

First, overtaking the arrears of maintenance.

Second, the resumption of works closed down during the war, if that is still desirable.

Third, works essential to public safety or to the reconstruction of blitzed areas, and works of special value to areas which are in urgent need of new industrial development.

Fourth, the elimination of obstructions to traffic on important roads, such as weak or narrow bridges, level crossings, and the linking up of improved sections of roads on important traffic routes.

Fifth, other works of improvement of high economic value.

This list is not intended to suggest any absolute priority, in the sense that every highway authority would be expected to complete all its maintenance work before it turns to works of improvement : in practice there must be overlapping of the different items.

The Government intends to encourage the preparation of major schemes of improvement, including some which are not considered at present of high priority, so that these schemes may form part of a long term and comprehensive programme of public works, available and ready to be put in hand, if general economic activity begins to give indications of an approaching decline. Without precluding progress in the preparation of other schemes in England and Wales and in Scotland that can be shown to be desirable, for traffic and economic reasons, the Government attaches importance, on the ground of its economic value to South Wales, to the provision of a new road crossing of the Severn Estuary. The re-investigation of the project for a Severn Barrage, which has just been instituted by the Minister of Fuel & Power, should not stand in the way of the provision of a new crossing, in view of the time which it would necessarily take to construct the barrage, if it were to be undertaken.

Motor Transport in Sierra Leone

Mr. R. W. Sorensen (West Leyton—Lab.) on January 26 asked the Secretary of State for the Colonies whether he was aware of complaints that locally-owned African motor-transport vehicles in Sierra Leone and elsewhere in West Africa, although passing the road test, were refused licences to run and that the Government was employing bus apprentices who had passed only an inferior test ; and whether he would make inquiries to see what adjustments could be made.

Colonel Oliver Stanley (Secretary of State for the Colonies) : I was already aware of the allegations mentioned in the question as regards Sierra Leone. I am awaiting a despatch from the Governor and I will communicate with Mr. Sorensen when I have received the Governor's report. I am not aware of any similar complaints having been made elsewhere in West Africa.

L.N.E.R. Canteen Opened at Neasden

As briefly recorded in our last week's issue, Mr. George Mills, Divisional General Manager, Southern Area, L.N.E.R., in the presence of railway and union officials, on January 20 opened a canteen at Neasden to serve the needs of the company's staff employed there.

Mr. Mills, in the course of a brief speech, told the staff that the opening of the canteen had been delayed somewhat by shortage of labour and materials, but that he was confident, from his first impressions of the arrangements generally, and of the food in particular, that it had been well worth awaiting. Under the skilful direction of John Gardner (London) Limited, which firm was responsible for the catering, and which already was operating 50 canteens for the company, the members of the staff, he felt sure, would find everything very much to their liking.

The canteen, which can seat 160 persons, is well ventilated and lighted, to achieve which results several additional windows have been let into the ends and one side of the building. The kitchen arrangements are all-electric. Mr. E. K. Portman Dixon, Canteen Superintendent, L.N.E.R., has advised the company's constructional and electrical engineers on all the requirements of an ideal canteen. The contractors for the work were Pitchers Limited.

In addition to Mr. Mills, among L.N.E.R. officials present at the opening were Messrs. E. K. Portman Dixon, Canteen Superintendent ; G. A. Musgrave, Locomotive Running Superintendent (Western Section), Southern Area ; W. E. Green, District Superintendent, Knebworth ; F. Lockwood, London Cartage Manager ; M. D. Robinson, District Locomotive Superintendent, Neasden ; A. L. Crewe and P. C. Randall, Divisional General Manager's Office, Southern Area ; and S. W. Jesper (representing Mr. George Dow, Press Relations Officer). The company's representative on the Canteen Committee was Mr. H. Stuffin, Yardmaster, Neasden ; and Messrs. F. C. Hedges, signalman, and B. Knight, fireman, both of Neasden, represented the staff. Mr. M. Pounder represented the N.U.R. ; Mr. P. Collick, the A.S.L.E.F. ; and Mr. G. C. Thorneycroft, the R.C.A. The firm of John Gardner (London) Limited was represented by Messrs. H. L. Gardner, S. F. Smith, and F. G. Venn.

Mr. George Mills, Divisional General Manager, Southern Area, L.N.E.R., being served with the first lunch to be dispensed at the new staff canteen at Neasden, after he had opened it on January 20 (see accompanying article)

Notes and News

Belfast & County Down Railway Company.—The directors recommend the payment of the arrears of dividends on the 5 per cent. cumulative preference stock for each of the years 1931 and 1932, less tax. Arrears for 1929 and 1930 were paid on March 1, 1943.

Collision near Hanover.—The Berlin radio has stated that 53 persons were killed and 62 injured when an express train ran into a stationary train in Porta Station, near Hanover, on January 20. There has been a substantial increase in the number of accidents on the German railways recently (as mentioned in our January 8 issue, page 93), but this collision at Hanover is interesting as including one of the largest fatality figures officially announced by the Germans.

Railway Amalgamation in Sweden.—According to a Reuters message, a preliminary agreement has been reached between the Swedish State Railways and a number of private railways in the eastern part of the province of Scania (Kristianstad region), concerning the amalgamation of those railways with the State Railways. A price of about Kr. 3·77 million will be paid. The amalgamation will come into force on July 1 this year.

Permanent Way Institution.—At a meeting of the Manchester & Liverpool Section of the Institution, to be held in the Staff Dining Room, L.M.S.R., Hunt's Bank Offices, Manchester, on February 5, at 3 p.m., the following three lectures will be given: (1) "The Organisation and Work of a Maintenance Gang," by Mr. T. H. Proctor; (2) "The Organisation and Work of a Relaying Gang," by Mr. H. Broadhurst; and (3) "Comparisons by a Private Works Ganger," by Mr. R. C. Ryder. The lecturers will describe the organisation of the men in their gangs, and will give a general idea of their work.

Parliamentary Debate on Transport in Northern Ireland.—Mr. Edmond Warnock, K.C. (Unionist, St. Annes), has tabled the following motion to be debated in the House of Commons of Northern Ireland during the next session: "That in the opinion of the House the public interest requires that public transport services by rail and by road should be co-ordinated, and, since the necessary co-ordination has not been accomplished by agreement between the railway companies and the Northern Ireland Road Transport Board, that the time has come for the appointment of some independent person with power to direct traffic to the most suitable medium of conveyance and generally to control, direct, and co-ordinate public transport to Ulster."

The San Paulo-Parana Railway.—The latest available official information concerning this Brazilian railway, the impending nationalisation of which has been reported, shows that 99·3 per cent. of the capital of the owning company, the Cia. Ferroviaria São Paulo-Parana, is held by Parana Plantations Limited. The report for the year ended June 30, 1943, shows a net credit balance amounting to Cr. $5,518,715 compared with Cr. $6,819,778 a year earlier. The ratio of operating expenses to traffic receipts increased from 43·57 per cent. to 47·79 per cent. although receipts were slightly higher and would have been considerably higher if rolling stock had been available to meet demand. It was not possible to obtain rolling stock from any source. An additional 18 km. (11 miles) were opened to provisional traffic late in the financial year, making the total length of line in operation 269 km. (167 miles). It may be recalled that, on May 15 of last year, it was officially announced that the directors of Parana Plantations Limited had received proposals from a Brazilian group for a possible sale of the company's assets in Brazil.

The Breakage of Rails.—On February 19, at 3 p.m., Mr. C. Dinsdale, B.Sc., of the London & North Eastern Railway, will give a lantern lecture on "How Rails Break" to the London Section of the Permanent Way Institution, at the Albert Stanley Institute, Great Church Lane, Hammersmith.

Argentine Trade Balance for 1943.—Official figures of the trade of Argentina for 1943 show a favourable balance of 1,242,464,000 pesos (about £74,500,000 at 16⅔ pesos to the £), compared with a balance of 514,596,000 pesos (about £30,900,000) in the previous year. Exports in 1943 totalled 2,184,705,000 pesos (about £131,100,000) and imports, 942,240,000 pesos (about £56,500,000), against 1,788,958,000 pesos (about £107,300,000) and 1,274,362,000 pesos (about £76,500,000), respectively, for 1942.

The Severe Fog in January.—It is now permissible to record that on Saturday, January 15, Great Britain had its worst fog for four years. Almost every part of the country was affected, and fixtures were abandoned in places as far apart as Aldershot, Nottingham, Leeds, Huddersfield, and Doncaster. Train services out of London were greatly disorganised. Inward traffic at Piccadilly Circus Station, London Transport, was greater than on any day since the Coronation in 1937, as there was a great rush to the underground railways, in view of surface transport disorganisation.

Rolling Rails in South America.—Last November the Companhia Siderurgica Belgo-Mineira, with appropriate ceremony, inaugurated operations in its recently-installed rail-rolling mill at the large steel manufacturing plant at Monlevade, in the State of Minas Geraes, Brazil. This is the first steel rail ever produced in South America. The entire plant and equipment for the railmill was furnished by United States manufacturers and was assembled and shipped by R. W. Hebard & Co., Inc. agent for the Belgo-Mineira Company in that country. The new mill will produce 60 to 70 lb. standard flat-bottom rail, and the ultimate capacity is intended to reach 50,000 tons a year. The plant is readily accessible to the greatest deposit of high-grade iron ore in the world. There is rail communication with Rio de Janeiro and the Port of Victoria. For the foregoing particulars we are indebted to our American contemporary, *Engineering News-Record*.

Beck & Pollitzer.—Ever since it was established in 1863, this well-known firm of haulage contractors, wharfingers, and warehousemen, has been a family partnership; it was founded by the grandfather of the present proprietors. On December 17, 1943, the business was converted into a limited company entitled Beck & Pollitzer Limited, which has acquired the goodwill, undertaking, and certain assets of the firm for £232,408. The purchase consideration is £110,000 in 5½ per cent. redeemable cumulative preference shares and £109,998 in fully-paid ordinary shares. The partners in the vendor firm, namely, Joseph Sigismund Frank Pollitzer, George Edward Percy Pollitzer, and Edward Percy Pollitzer, become the sole directors of the company and retain all the ordinary shares, thus preserving the family character of the undertaking. The total authorised capital is £300,000, equally divided between ordinary and preference shares. The assets acquired by the company include the whole of the issued capital of Beck & Pollitzer (Contracts) Limited, which undertakes exhibition stand fitting and building, and also that of Groupage Limited. According to the last available figures, the firm owns 110 road vehicles.

Central Station for Rosario.—An Argentine Government Decree issued through the Ministry of Public Works authorises the appointment of a committee

British and Irish Railway Stocks and Shares

Stocks	Highest 1943	Lowest 1943	Prices Feb. 1, 1944	Prices Rise/Fall
G.W.R.				
Cons. Ord.	65¼	57½	61½	+ ¼
5% Con. Pref. ...	120½	108	119½	+ ½
5% Red. Pref. (1950)	110½	106	109	—
5% Rt. Charge ...	137½	123½	130½	—
5% Cons. Guar. ...	135½	121⅞	129½	+ 1
4% Deb.	118	107½	113½	—
4½% Deb.	119	109⅞	115½	—
4½% Deb.	124½	116	122½	—
5% Deb.	138	127	131½	—
2½% Deb.	77	72½	74½	+ 1
L.M.S.R.				
Ord.	34⅛	28	33½	—
4% Pref. (1923) ...	66½	58	63	—
4% Pref.	80½	73	80	+ 2
5% Red. Pref. (1955)	105¾	102	103½	—
4% Guar.	107	98½	104½	+ 1½
4% Deb.	109¾	103½	107	+ ½
5% Red. Deb. (1952)	111½	108	109½	—
L.N.E.R.				
5% Pref. Ord. ...	12⅛	7⅜	9⅞	— ⅛
Def. Ord.	5⅜	3⅜	4⅝	+ ⅛
4% First Pref. ...	66½	57½	62	—
4% Second Pref. ...	36½	30⅜	34½	—
5% Red. Pref. (1955)	99⅜	93	99½	+ 1
4% First Guar. ...	102⅜	94	100½	+ 1½
4% Second Guar. ...	93½	85⅜	92½	+ 1½
3% Deb.	86⅜	78⅜	81½	—
4% Deb.	109⅞	101⅜	106	+ ½
5% Red. Deb. (1947)	106½	102	104	—
4½% Sinking Fund Red. Deb. ...	108	103½	104½	—
SOUTHERN				
Pref. Ord.	80	72½	77½	+ ½
Def. Ord.	26½	20⅝	25	— ⅛
5% Pref.	119½	106⅝	119	+ ½
5% Red. Pref. (1964)	114	108½	114½	—
5% Guar. Pref. ...	136	122	129½	+ 1
5% Red. Guar. Pref. (1957)	117	109⅜	113½	—
4% Deb.	117½	106	113	—
5% Deb.	137	126	128½	—
4% Red. Deb. (1962-67)	112	106½	108½	—
4% Red. Deb. (1970-80)	112	107	108½	—
FORTH BRIDGE				
4% Deb.	109	104⅞	105	—
4% Guar.	105	102½	102½	—
L.P.T.B.				
4½% "A"	125½	114	120½	+ 1
5% "A"	133⅜	123	128½	—
3% Guar. (1967-72)	100¼	97	99	—
5% "B"	124	114	120½	+ 1
"C"	72	53	66	—
MERSEY				
Ord.	34½	27	34	—
3% Perp. Pref. ...	68	59½	66	—
4% Perp. Deb. ...	104	102½	103	—
3% Perp. Deb. ...	83	78½	79	—
IRELAND				
BELFAST & C.D.				
Ord.	9	6	7½	—
G. NORTHERN				
Ord.	24½	16	26½	+ ½
Pref.	—	—	45½	+ ½
Guar.	—	—	64	+ 1½
Deb.	—	—	82	— 2
G. SOUTHERN				
Ord.	30	9½	49	+ 4
Pref.	30	11	49½	+ 3½
Guar.	64	26½	71½	+ ½
Deb.	88½	51½	88½	— ½

§ ex-dividend

to draw up a scheme for the construction of a joint central station in Rosario for the use of all the railways serving that city. The committee, which will be under the Chairmanship of the Under-Secretary of the Ministry of Public Works, will consist of representatives of the National Railway Board, the State Railways, the Department of Navigation & Ports, the Santa Fé Provincial Government, the Rosario Municipality, and the Central Argentine, Province of Santa Fé, Rosario-Puerto Belgrano and Buenos Aires Provincial Railways.

Midland Bank Limited.—The directors report that, after appropriation to contingency accounts, out of which full provision has been made for all bad and doubtful debts, net profit for the year 1943 amounts to £1,984,396 which, with £661,123 brought forward, makes £2,645,519, out of which the following appropriations amounting to £1,356,345 have been made: to interim dividend paid July 15, 1943, at rate of 8 per cent. actual, less tax, £606,345; to reserve fund £500,000; to reserve for future contingencies £250,000; leaving £1,289,174, from which the directors recommend a dividend payable February 1, for the half-year ended December 31, 1943, at the rate of 8 per cent. actual (1s. 7½d. per £1 of share capital paid up), less tax, £606,345, carrying forward £682,829.

Scientific and Industrial Research.—In a report on scientific and industrial research submitted by a special committee (appointed last June) of the London Chamber of Commerce, which was adopted at a recent meeting of the latter, the following proposals are recommended: (1) a centralised and planned direction, through a central research board; (2) a far greater stream of money flowing into research; and (3) a larger, better-trained, and better-paid staff. The central board would be a co-ordinating and directing body for all research organisations, and be the link between the Government and the research activities of the country. If the Board of Trade or the Department of Overseas Trade found that British products were losing their markets here or abroad in competition with those of other nations, and it appeared that the loss was due to poor quality or high price, they would place the facts before the central board, which would take the matter up with the research associations and the laboratories of individual firms.

Bernina Railway.—Reuters reports, quoting the German official news agency from Zürich, that the directors of the Bernina Railway Company have decided to amalgamate the company with that of the Rhaetian Railway, subject to approval by the general meeting of the Rhaetian Railway Company. It has been agreed between the Canton Graubuenden and the Swiss Confederation that the latter is to pay (Swiss) fr. 35·6 million towards the reorganisation of the Rhaetian Railway Company; an amount of fr. 25·6 million is to be written off from the start, and for the remaining fr. 10 million preference shares are to be issued. The canton's share towards the reorganisation of the Rhaetian Railway Company amounts to fr. 38·5 million, and the canton will receive fr. 20 million-worth of preference shares for the conversion of capital-and-interest-claims. Furthermore, the canton is to renounce its interest loan amouunting to fr. 2·58 million, and agrees to a reduction of the nominal value of its shares from fr. 350 to fr. 50. The previous assistance rendered by the canton is valued at fr. 1·88 million. The budget of the Rhaetian Railway Company for 1944 estimates revenues at fr. 13·97 million, which probably will be adequate to cover all expenditure. (The Bernina Railway has been operated by the Rhaetian Railway since January 1, 1942, but the company has remained separate).

Budapest Aerodrome.—A motor road connecting Budapest with the new Ferihegy Aerodrome now being built to the north-east of Budapest, was opened to traffic on November 4 last. Ferihegy Aerodrome is 9 miles from the centre of the capital, and the new motor road, stated to be the first real motorway in Hungary, is 7 miles long. Outside the town the road is divided into three lanes, of which the central one is reserved for fast motor traffic, while the side ones are intended for lorry and cycle traffic. The road is carried by two bridges across the Budapest-Vac (for Bratislava) main railway line. The new aerodrome is to supersede the Budaörs civil aerodrome, on the Budapest-Györ main railway line, in the south-western outskirts of the capital, only 4 miles from its centre.

Clogher Valley Railway.—The Ministry of Finance for Northern Ireland, which has now acquired 80 per cent. of the capital of the Clogher Valley Railway Co. Ltd., has made a final offer to the minority shareholders for the purchase of the remaining shares at £10 for each £10 share held. The offer includes a small amount of accrued interest. The majority holding by the Ministry was acquired at an average price of £8 5s. for each £10 share. In the event of non-acceptance the Ministry had intended to test in the Courts the question whether the dividend guarantee by certain baronies in Counties Tyrone and Fermanagh would continue to be applicable, but it now seems probable that acceptance will be general. The railway was closed to traffic on December 31, 1941.

Road Accidents in 1943.—The Ministry of War Transport announces that the number of deaths which occurred during 1943 as results of road accidents was 5,796, the lowest total for many years; comparative figures for years since 1938, inclusive, were as follows:—

Year	Number of road deaths
1938	6,648
1939	6,282
1940	8,609
1941	9,169
1942	6,926
1943	5,796

The number of deaths which resulted from road accidents in December last was 690, compared with 780 in December, 1942; persons seriously injured numbered 3,150 (against 3,461 in December, 1942), and those slightly injured, 8,387 (9,398). Although the total number of persons killed during 1943 was the lowest for some years, the figure for children killed was well above the pre-war level.

Major-General Gilbert Szlumper's Scheme for Transport.—In connection with the proposal for a central control board for the operation of all road, rail, canal and internal air services, put forward by Major-General Gilbert Szlumper, Director-General of Supply Services, Ministry of Supply, in a recent speech (reported in our last week's issue), the British railway companies issued the following statement on January 26: "The attention of the chairmen of the main-line railway companies has been drawn to the post-war proposals outlined on Tuesday (January 25) by Major-General Szlumper (former General Manager of the Southern Railway) at the luncheon of the Engineering Industries Association. The chairmen wish to make it clear that Major-General Szlumper was expressing his personal opinion and that his views are not those held by the boards of the four main-line companies." Major-General Szlumper later stated that he was the biggest user of the railways at the moment, and that his views had been formed by personal experience. He was speaking only for himself, and the railway companies were quite entitled to disagree with his views. If the disagreement made people think about the transport problem so much the better.

East Yorkshire Motor Services Limited.—Total revenue for the year to September 30, 1943, of this subsidiary of the L.N.E.R. and B.E.T. Omnibus Services Limited, amounted to £443,815 (£450,686). After deducting all expenses and providing for depreciation there remains a balance of £22,965 (£21,427) to which has to be added £17,324 (£18,397) brought forward, making a total of £40,829 (£39,824). The dividend for the year is again 7½ per cent. net, and £17,789 is carried forward.

German Wagons for Spain.—It is reported that 150 eight-wheel goods wagons have been supplied to Spain from Germany by a new concern known as Transfesa, and that they have been acquired by the Spanish National Railways. Transfesa is credited also with having equipped a special livestock train ordered by the Spanish National Railways some time ago.

New Industrial Research Laboratories.—According to the annual report of the British Electrical & Allied Industries Research Association, an important group of industrial research laboratories is likely to be developed at Leatherhead (Surrey). The council of the Association has decided to buy a site adjacent to one secured by the British Coal Utilisation Research Association, and to co-operate with several interested associations which had found that they would require better facilities to meet the needs of their industries.

Argentine State Railways to Serve Concordia.—The Argentine Ministry of Public Works has issued a Decree rescinding the contract entered into with the Argentine North Eastern Railway, dated February 19, 1924, under which the company undertook the service of the port of Concordia, in the Province of Entre Rios. Another Decree issued by the same authority sanctions the agreement made between the Department of Navigation & Ports and the State Railways Administration for the operation by the latter of the port railway-services.

Great Northern Railway Company (Ireland).—The directors have had before them the accounts for the year 1943 and have resolved, subject to audit, to recommend to the proprietors the payment, on April 1 next, of the following dividends (less income tax) in respect of the year ended December 31, 1943:—£2 per cent. (final) on the consolidated 4 per cent. guaranteed stock, making, with the interim dividend of £2 per cent. paid on October 1 last, £4 per cent. for the year; £4 per cent. on the consolidated 4 per cent. preference stock; £2 10s. per cent. on the ordinary stock.

Welsh Highland Light Railway.—A petition for the winding-up of the Welsh Highland Railway (Light Railway) Company was on January 24 presented to the Chancery Division (Companies Court) by the Carnarvonshire County Council (creditor of the company). The petition is directed to be heard before the Court on February 7. Notice by any creditor or contributory of the company desirous to support or oppose the making of an Order on the petition must be given in writing in time to reach J. D. Jones & Co., 80, Fleet Street, E.C.4, the solicitors for the petitioner, not later than 1 p.m. on February 5.

Railway Stock Market

In the absence of any marked improvement of business in Stock Exchange markets, movements in values again have been comparatively moderate, although the general undertone remained firm. Sentiment was assisted by the rising trend in British Funds that followed the announcement of the intention to repay the 5 per cent. Conversion Loan 1944-64, which means that later in the year the volume of money seeking investment will be increased by £318 millions. Because markets generally have been only moderately active, home railway junior stocks attracted less attention than might have been expected in view of the forthcoming dividend announcements, which will commence on Wednesday next with that of the L.M.S.R. The L.M.S.R. announcement is awaited with considerable interest, because in this case there appears to be the possibility of a fractionally higher dividend unless it is decided to repeat the allocation to contingencies reserve made a year ago. To some extent attention has tended to be diverted from the question of pending dividends and the generous yields still ruling, because the views put forward recently by Mr. Gilbert Szlumper have emphasised problems that will have to be settled as to post-war organisation and control of transport. The railway chairmen have made it clear that Mr. Gilbert Szlumper's views are not those held by the boards of the four main-line companies. The latter can be expected to have proposals which will be put forward when the important question of post-war transport organisation is being negotiated. Whatever the final agreement, there is every reason to expect that railway stockholders will be treated fairly. The war has emphasised the efficiency and vital importance of the railways, and their goodwill with the public probably never has been higher. Meanwhile, however, due to the fixed-rental agreement, the small dividends on the junior stocks are in marked contrast to the substantial expansion in earnings of the railways. Whereas junior stocks have tended to show small fluctuations and are little changed on balance, prior charges and senior preference stocks remained firm and have fully held recent gains. Sentiment as to prior-charges has again been aided by the trend in gilt-edged stocks and by the fact that they offer yields which continue to compare favourably with those on other front-rank investments. At current prices, the yield on Great Western 4 per cent. debentures is 3½ per cent., that on L.M.S.R. 4 per cent. debentures 3¾ per cent., and L.N.E.R. 3 per cent. debentures return over 3⅝ per cent., Southern 4 per cent. debentures a little more than 3½ per cent., and London Transport 4½ per cent. "A" stock also slightly over 3½ per cent.

Compared with a week ago, Great Western ordinary has improved from 61 to 61½, and the 5 per cent. preference at 119½ was also half-a-point better on balance. The guaranteed stock showed a similar gain at 129½, the 4 per cent. debentures were maintained at 114. L.M.S.R. ordinary was 33½, compared with 33⅜; the 1923 preference at 62⅞ was the same as a week ago; the senior preference moved up further from 78½ to 79½. L.M.S.R. guaranteed was higher at 104. L.N.E.R. second preference showed improvement on balance from 34 to 34⅛. The first preference eased from 61⅞ to 61½, and would appear to be relatively undervalued; the current level is 1½ points below that for L.M.S.R. 1923 preference. L.N.E.R. first guaranteed was at par and the second guaranteed 92. Southern deferred, 25½ a week ago, has since eased to 24⅞, but the preferred moved up from 77 to 77½. Southern 5 per cent. preference was higher at 118½, as was the guaranteed stock at 129½. London Transport "C" was maintained at 66½.

After the news of the Argentine's break with the Axis Powers, Argentine railway stocks showed a general rally. In the absence of sustained improvement in demand, however, earlier gains were not fully held. At the time of writing B.A. Gt. Southern ordinary is 13¾, the 5 per cent. preference 27, and the 4 per cent. debentures 62. Other gains on balance included Central Argentine 4 per cent. debentures from 50 to 52, and B.A. Western ordinary from 10½ to 12½. Elsewhere, United of Havana debentures rallied to 26 after the meeting. Leopoldina debentures were better at 53. A number of gains were recorded among Indian railway stocks. Canadian Pacifics were more active on dividend hopes.

Traffic Table and Stock Prices of Overseas and Foreign Railways

	Railways	Miles open	Week ending	Traffic for week: Total this year	Traffic for week: Inc. or dec. compared with 1941/2	No. of Weeks	Aggregate traffics to date: Totals 1942/3	Aggregate traffics to date: Totals 1941/2	Aggregate traffics to date: Increase or decrease	Shares or stock	Prices: Highest 1943	Prices: Lowest 1943	Prices: Feb. 1, 1944	Yield % (See Note)
				£	£		£	£	£					
South & Central America	Antofagasta (Chile) & Bolivia	834	23.1.44	33,480	+ 3,070	4	121,160	106,600	+ 14,560	Ord. Stk.	15⅜	10	12¼	Nil
	Argentine North Eastern	753	22.1.44	13,950	+ 3,642	30	420,672	382,380	+ 38,292	..	7⅜	5	6¼	Nil
	Bolivar	174	Dec., 1943	4,776	— 1,467	52	62,732	59,762	+ 2,970	6 p.c. Deb.	22½	18	21½	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds	23½	19	18½	Nil
	Buenos Ayres & Pacific	2,807	22.1.44	120,300	+ 8,100	30	2,906,100	2,785,620	+ 120,480	Ord. Stk.	8½	5¼	7	Nil
	Buenos Ayres Great Southern	5,080	22.1.44	244,740	+ 46,200	30	4,979,820	4,476,780	+ 503,040	Ord. Stk.	17½	9¼	13¾	Nil
	Buenos Ayres Western	1,930	22.1.44	64,020	+ 9,060	30	1,565,160	1,560,420	+ 4,740	..	16	9⅞	12	Nil
	Central Argentine	3,700	22.1.44	160,071	+ 14,427	30	4,262,835	3,850,635	+ 412,200	..	10¾	6¼	9	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	4½	3	4	Nil
	Cent. Uruguay of M. Video	972	22.1.44	34,932	— 218	30	984,915	720,668	+ 264,247	Ord. Stk.	7⅜	4½	5½	Nil
	Costa Rica	262	Dec., 1943	15,803	+ 849	25	130,194	79,919	+ 50,275	Stk.	16	14⅞	15	Nil
	Dorada	70	Dec., 1943	29,000	+ 8,000	52	272,607	194,705	+ 77,902	1 Mt. Db.	96	92	93½	6⅛
	Entre Rios	808	22.1.44	19,584	+ 3,504	30	585,816	543,888	+ 41,928	Ord. Stk.	9	5½	7	Nil
	Great Western of Brazil	1,030	22.1.44	24,400	+ 6,500	4	71,300	56,000	+ 15,300	Ord. Sh.	59/9	24/7½	27/6	Nil
	International of. Cl. Amer.	794	Nov., 1943	$565,434	+ $83,910	47	$6,589,280	$5,554,318	+ $1,034,962	—	—	—	—	—
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	1st Pref.	2¾	1¼	1½	Nil
	La Guaira & Caracas	22½	Dec., 1943	6,985	— 2,575	52	97,885	90,370	+ 7,515	5 p.c. Deb.	90	80	87½	Nil
	Leopoldina	1,918	22.1.44	43,161	+ 13,640	4	130,603	85,121	+ 45,482	Ord. Stk.	7⅛	4	5½	Nil
	Mexican	483	21.1.44	ps. 349,300	+ ps.69,300	4	ps.1,037,400	ps. 857,100	+ ps. 180,300	Ord. Stk.	1⅞	¾	1	Nil
	Midland Uruguay	319	Oct., 1943	17,778	+ 2,984	50	65,802	50,786	+ 14,916	—	—	—	—	—
	Nitrate	382	15.1.44	5,438	— 1,291	3	5,438	6,729	— 1,291	Ord. Sh.	83/9	71/3	68/9	Nil
	Paraguay Central	274	21.1.44	$45,695	+ $4,635	30	$1,556,947	$1,140,170	+ $416,777	Pr. Li. Stk.	75	51½	69	8⅞
	Peruvian Corporation	1,059	Dec., 1943	115,532	+ 32,487	27	637,187	497,667	+ 139,520	Pref.	17⅜	10¾	10	Nil
	Salvador	100	Nov., 1943	c 94,000	+ c 10,000	21	c 429,000	c 320,000	+ c 109,000	—	—	—	—	—
	San Paulo	153½	9.1.44	53,929	+ 17,370	2	57,140	45,285	+ 11,855	Ord. Stk.	71	57	56	3½
	Taltal	160	Dec., 1943	7,725	+ 2,042	26	35,225	31,086	+ 4,139	Ord. Sh.	37/6	20/-	20/-	Nil
	United of Havana	1,301	22.1.44	57,124	+ 530	30	1,380,229	1,343,328	+ 36,901	Ord. Stk.,	8½	3¾	3¾	Nil
	Uruguay Northern	73	Oct., 1943	1,438	— 14	17	5,548	4,757	+ 791	—	—	—	—	—
Canada	Canadian Pacific	17,034	21.1.44	1,110,200	+ 259,600	3	3,104,800	2,581,800	+ 523,000	Ord. Stk.	18	13⅞	16	Nil
India†	Barsi Light	202	Dec., 1943	19,058	— 1,057	39	191,400	151,518	+ 40,882	—	—	—	—	—
	Bengal-Nagpur	3,267	Dec., 1943	939,400	— 85,625	39	9,161,775	8,081,550	+ 1,080,225	Ord. Stk.	104½	101½	103½	3⅞
	Madras & Southern Mahratta	2,939	10.10.43	247,050	— 107	28	5,325,600	4,541,813	+ 783,787	..	110	106	108½	6⅛
	South Indian	2,349	30.11.43	197,318	+ 28,836	34	4,892,362	4,218,218	+ 674,144	..	105½	101½	108½	4
Various	Egyptian Delta	—	10.12.43	19,974	+ 3,102	38	396,384	309,214	+ 87,170	Prf. Sh.	6⅞	2⅞	4½	Nil
	Manila	—	—	—	—	—	—	—	—	B. Deb.	45	32	41½	9
	Midland of W. Australia	277	Nov., 1943	30,114	— 10,384	21	165,805	159,912	+ 5,893	Inc. Deb.	101	93	100	6
	Nigerian	1,900	30.12.43	68,456	+ 7,866	26	1,933,466	1,833,420	+ 160,046	—	—	—	—	—
	South Africa	13,291	20.11.43	868,462	+ 46,677	34	27,853,826	26,030,676	+ 1,823,150	—	—	—	—	—
	Victoria	4,774	Sept, 1943	1,321,580	— 51,483	—	—	—	—	—	—	—	—	—

Note. Yields are based on the approximate current prices and are within a fraction of ⅛ Argentine traffics are given in sterling calculated @ 16⅔ pesos to the £
† Receipts are calculated @ 1s. 6d. to the rupee § ex dividend